

=> file reg

FILE 'REGISTRY' ENTERED AT 20:00:47 ON 09 MAR 2004
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=> display history full 11-

FILE 'REGISTRY' ENTERED AT 19:26:11 ON 09 MAR 2004
E CYANURIC CHLORIDE/CN
L1 1 SEA "CYANURIC CHLORIDE"/CN
E CYANOGEN CHLORIDE/CN
L2 1 SEA "CYANOGEN CHLORIDE"/CN

FILE 'HCA' ENTERED AT 19:28:12 ON 09 MAR 2004
L3 7131 SEA L1 OR CYANURIC#(A)CHLORIDE#
L4 1558 SEA L2 OR CYANOGEN#(A)CHLORIDE#
L5 95 SEA L3 AND L4

FILE 'REGISTRY' ENTERED AT 19:28:20 ON 09 MAR 2004
E CARBON/CN
L6 1 SEA CARBON/CN
E GRAPHITE/CN
L7 1 SEA GRAPHITE/CN

FILE 'LCA' ENTERED AT 19:30:08 ON 09 MAR 2004
L8 1163 SEA GRAPHIT? OR CARBONIFEROUS? OR CARBONACEOUS? OR
(CARBON# OR C OR CHARCOAL#) (A) (BLACK# OR ACT# OR ACTIV?)
OR BLACK#(A) (LEAD# OR LAMP# OR CHANNEL# OR BONE# OR
CHIMNEY# OR STOVE# OR GAS) OR BLACKLEAD# OR LAMPBLACK#
OR BONEBLACK# OR CHIMNEYBLACK# OR STOVEBLACK# OR NORIT#
OR GASBLACK#

FILE 'HCA' ENTERED AT 19:36:24 ON 09 MAR 2004
L9 591580 SEA L6 OR L7 OR L8 OR ACTIVAT?(2A)CARBON#
L10 29 SEA L5 AND L9
L11 237 SEA L1/P
L12 426 SEA L2 (L) RACT/RL
L13 34 SEA L5 AND L11
L14 33 SEA L5 AND L12
L15 21 SEA L13 AND L14
L16 18 SEA (L13 OR L14 OR L15) AND L9

FILE 'LCA' ENTERED AT 19:38:43 ON 09 MAR 2004
L17 390 SEA BET OR B(A)E(A)T OR SURFACE?(2A)AREA# OR M2(A) (G OR
GR OR GM# OR GRM# OR GRAM#)

L18 656 SEA (PORE# OR PORO?) (2A) (VOL# OR VOLUM? OR DIA# OR DIAM# OR DIAMET? OR RADIUS# OR RADII#) OR EPV OR E(A)P(A)V OR (ML OR CC OR CM3 OR MILLILITER#) (A) (G OR GR OR GRM# OR GRAM#)

FILE 'HCA' ENTERED AT 19:53:45 ON 09 MAR 2004

L19 3 SEA L5 AND L17
L20 1 SEA L5 AND L18
L21 3 SEA L19 OR L20
L22 25 SEA (L15 OR L16) NOT L21
L23 10 SEA L10 NOT (L21 OR L22)
L24 19 SEA (L13 OR L14) NOT (L21 OR L22 OR L23)
L25 3 SEA L21 AND (1907-1999/PY OR 1907-1999/PRY)
L26 24 SEA L22 AND (1907-1999/PY OR 1907-1999/PRY)
L27 10 SEA L23 AND (1907-1999/PY OR 1907-1999/PRY)
L28 19 SEA L24 AND (1907-1999/PY OR 1907-1999/PRY)

=> file hca

FILE 'HCA' ENTERED AT 20:01:15 ON 09 MAR 2004

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=> d l21 1-3 ibib abs hitstr hitind

L21 ANSWER 1 OF 3 HCA COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 133:296454 HCA

TITLE: Process and activated carbon catalysts for the production of **cyanuric chloride** by the trimerization of cyanic acid chloride

INVENTOR(S): Marquardt, Ralph; Schauhoff, Stephanie; Schick, Christine; Boerner, Walter; Vanheertum, Rudolf

PATENT ASSIGNEE(S): Degussa-Huels AG, Germany

SOURCE: Ger. Offen., 6 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
DE 19918245	A1	20001026	DE 1999-19918245	19990422
WO 2000064879	A1	20001102	WO 2000-EP2013	20000308
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR,				

CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,
 ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
 LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU,
 SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ,
 VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
 RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
 DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF,
 BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
 EP 1183244 A1 20020306 EP 2000-912567 20000308
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
 PT, IE, SI, LT, LV, FI, RO

PRIORITY APPLN. INFO.: DE 1999-19918245 A 19990422
 WO 2000-EP2013 W 20000308

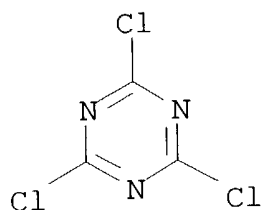
OTHER SOURCE(S): CASREACT 133:296454

AB **Cyanuric chloride** is prepd. in high yield and selectivity, with reduced catalyst deactivation by the trimerization of ClCN using washed, activated charcoal, having a **BET surface area** of $\geq 1000 \text{ m}^2/\text{g}$, and Fe content of $< 0.15\%$, and an effective **pore vol.** of $\geq 0.17 \text{ mL/g}$ with **pore diams.** of 0.5-7 nm, as the catalyst at $\geq 250^\circ$.

IT **108-77-0P, Cyanuric chloride**
 (process and activated carbon catalysts for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)

RN 108-77-0 HCA

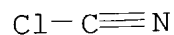
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT **506-77-4, Cyanogen chloride**
 (process and activated carbon catalysts for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IC ICM C07D251-28

- CC 28-19.(Heterocyclic Compounds (More Than One Hetero Atom))
Section cross-reference(s): 45, 48, 67
- ST **cyanuric chloride** prepn **cyanogen chloride** trimerization; catalyst activated carbon trimerization **cyanogen chloride** prepn trichlorotriazine; deactivation redn trimerization catalyst prepn **cyanuric chloride**
- IT Trimerization
(of **cyanuric chloride** by the trimerization of cyanic acid chloride)
- IT Trimerization catalysts
(washed activated carbon for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)
- IT 7440-44-0P, Activated carbon, preparation
(activated; process and activated carbon catalysts for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)
- IT 7439-89-6P, Iron, preparation
(process and activated carbon catalysts for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)
- IT 108-77-0P, **Cyanuric chloride**
(process and activated carbon catalysts for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)
- IT 506-77-4, **Cyanogen chloride**
(process and activated carbon catalysts for the prodn. of **cyanuric chloride** by the trimerization of cyanic acid chloride)

L21 ANSWER 2 OF 3 HCA COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 109:24519 HCA
TITLE: Activated carbon cyclotrimerization catalysts
INVENTOR(S): Pascaru, Alexandru; Opreescu, Ion Ro; Dulama, Gheorghe; Toc, Valeriu; Bariz, Stefan; Apetrei, Constantin
PATENT ASSIGNEE(S): Institutul de Cercetari Chimice "Icechim", Bucuresti, Rom.
SOURCE: Rom., 3 pp.
CODEN: RUXXA3
DOCUMENT TYPE: Patent
LANGUAGE: Romanian
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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RO 93134	B1	19871230	RO 1985-119740	19850802

PRIORITY APPLN. INFO.:

RO 1985-119740

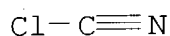
19850802

AB Activated carbon catalysts contg. <5% ash, useful for cyclotrimerization of CNCl to **cyanuric chloride**, are prepd. from activated carbon with 9-12% ash by boiling with HCl soln. in a closed reactor for 20 h and drying for ≥ 6 h at 600° in an inert gas. Thus, activated carbon (av. particle size 4 mm, sp. **surface area** 1000 m^2/g , bulk d. 0.65 ton/m^3 , compressive strength 2.0-4.0 $\text{kg}/\text{granule}$, ash content 9-12%) was treated in 25% HCl at 75-84% for 20 h in a closed reactor. The treated material was then washed with H_2O and dried under N at 600° for 8 h. The resulting activated carbon catalyst contained .apprx.5% ash, its compressive strength was 0.8 $\text{kg}/\text{granule}$, while its other properties remained unchanged. The sp. consumption of this catalyst in CNCl cyclotrimerization was 60 kg/ton which was less than that of catalysts prepd. by conventional methods.

IT **506-77-4, Cyanogen chloride** (CNCl)
(cyclotrimerization of, in **cyanuric chloride**
manuf., activated carbon catalysts for)

RN 506-77-4 HCA

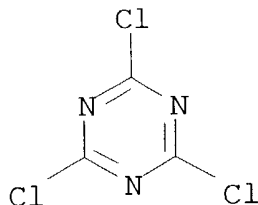
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IT **108-77-0P, Cyanuric chloride**
(manuf. of, by **cyanogen chloride**
cyclotrimerization, activated carbon catalysts for)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC ICM C01B031-08

ICS B01J021-18

ICA C07C119-045

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 28, 67

ST cyclotrimerization catalyst activated carbon manuf; **cyanuric chloride** cyclotrimerization catalyst manuf

IT Trimerization catalysts
(cyclo-, activated carbon, for **cyanogen**

- chloride to cyanuric chloride)**
 IT 7440-44-0, Carbon, uses and miscellaneous
 (activated, cyclotrimerization catalysts, for **cyanogen
 chloride to cyanuric chloride)**
 IT 506-77-4, Cyanogen chloride (CNCl)
 (cyclotrimerization of, in **cyanuric chloride**
 manuf., activated carbon catalysts for)
 IT 108-77-0P, Cyanuric chloride
 (manuf. of, by **cyanogen chloride**
 cyclotrimerization, activated carbon catalysts for)

L21 ANSWER 3 OF 3 HCA COPYRIGHT 2004 ACS on STN
 ACCESSION NUMBER: 79:44009 HCA
 TITLE: Pure **cyanogen chloride**
 INVENTOR(S): Kricsfalussy, Zoltan; Bloecher, Karlheinz;
 Pawlowski, Juri; Scherhag, Bernhard; Weiler,
 Raoul
 PATENT ASSIGNEE(S): Bayer A.-G.
 SOURCE: Ger. Offen., 7 pp.
 CODEN: GWXXBX
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 2157973	A1	19730524	DE 1971-2157973	19711123
GB 1358140	A	19740626	GB 1972-52880	19721116
US 3897541	A	19750729	US 1972-307663	19721117
NL 7215681	A	19730525	NL 1972-15681	19721120
JP 48063994	A2	19730905	JP 1972-115722	19721120
IT 971079	A	19740430	IT 1972-31933	19721121
AT 316588	B	19740725	AT 1972-9901	19721121
CA 979178	A1	19751209	CA 1972-157060	19721121
BE 791751	A1	19730522	BE 1972-124474	19721122
ES 408862	A1	19751016	ES 1972-408862	19721122
FR 2161012	A1	19730706	FR 1972-41687	19721123
			DE 1971-2157973	19711123

PRIORITY APPLN. INFO.:

- AB ClCN, free of water and **cyanuric chloride**, was
 made by reaction of HCN and Cl at .apprx. 1:1 molar ratio with a
 slight Cl excess over an active carbon catalyst at 500°.
 Thus, 1.6 moles anhyd. HCN/hr and 1.67 moles dry Cl/hr were passed
 into a reactor contg. 29 cm³ active carbon of **surface**
area 1000 m²/g at 600° to give 49
 moles ClCN/hr per 1. of catalyst at a HCN conversion of 100%.
 IT 506-77-4P
 (from chlorine and hydrocyanic acid, active carbon catalyst for)

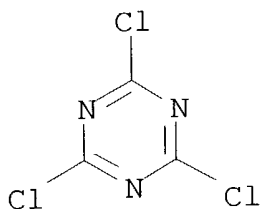
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C01C
CC 49-8 (Industrial Inorganic Chemicals)
ST **cyanogen chloride** prodn; hydrocyanic acid
reaction chlorine; carbon catalyst **cyanogen
chloride**
IT **506-77-4P**
(from chlorine and hydrocyanic acid, active carbon catalyst for)

=> d 123 1-10 cbib abs hitstr hitind

L23 ANSWER 1 OF 10 HCA COPYRIGHT 2004 ACS on STN
129:163570 Combustion behavior and flame structure of tetrazole
derivatives. Sinditskii, Valery P.; Egorshev, Viachcheslav Y.;
Fogelzang, Alexander E.; Serushkin, Valery V.; Kolesov, Vasilii I.
(Mendeleev Univ. Chemical Technology, Moscow, 125047, Russia).
International Annual Conference of ICT, 29th(Energetic Materials),
171.1-171.14 (English) 1998. CODEN: IACIEQ. ISSN: 0722-4087.
Publisher: Fraunhofer-Institut fuer Chemische Technologie.
AB Combustion behavior of tetrazole and 5-chlorotetrazole was studied
in the form of pressed strands in a window const. pressure bomb at
0.1-36 MPa. Temp. profiles in the combustion wave were measured by
thin W-Re thermocouples embedded in the strands. Analyses of
condensed combustion products were carried out by IR
spectrophotometry. The principal feature of tetrazole combustion
consists in formation of stable energetic nitrile derivs. in the
combustion products rather than equil. adiabatic compn., resulting
in incomplete heat release. In spite of decompn. nature of the
rate-controlling reactions, they prove to be different than those in
slow thermal decompn. at 150-250°. By the example of
tetrazole, a new combustion regime was suggested, characterized by
variations in the surface temp. The periodic process involves a
gradual accumulation of a product of high decompn./boiling temp. at
the burning surface, followed by ejecting thereof in the gas and
clearing the surface.
IT **108-77-0 506-77-4**, Chlorocyan **7440-44-0**,
Carbon, formation (nonpreparative)
(combustion products of tetrazole derivs.)
RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA
 CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

RN 7440-44-0 HCA
 CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

CC 50-1 (Propellants and Explosives)
 Section cross-reference(s): 22
 IT 74-90-8, Hydrocyanic acid, formation (nonpreparative)
108-77-0 108-78-1, Melamine, formation (nonpreparative)
 290-87-9, 1,3,5-Triazine 420-04-2, Cyanamide 460-19-5,
 Ethanedinitrile 461-58-5, Guanidine, cyano- **506-77-4**,
 Chlorocyan 1333-74-0, Hydrogen, formation (nonpreparative)
7440-44-0, Carbon, formation (nonpreparative) 7647-01-0,
 Hydrochloric acid, formation (nonpreparative) 7727-37-9, Nitrogen,
 formation (nonpreparative) 22537-15-1, formation (nonpreparative)
 (combustion products of tetrazole derivs.)

L23 ANSWER 2 OF 10 HCA COPYRIGHT 2004 ACS on STN
 116:135528 Performance-oriented packaging standards; changes to
 classification, hazard communication, packaging and handling
 requirements based on UN standards and agency initiative. (United
 States Dept. of Transportation, Washington, DC, 20590-0001, USA).
 Federal Register, 55(246), 52402-729 (English) 21 Dec 1990. CODEN:
 FEREAC. ISSN: 0097-6326.

L23 ANSWER 3 OF 10 HCA COPYRIGHT 2004 ACS on STN
 97:184837 **Cyanogen chloride**. Kriele, Ulrich;
 Michaud, Horst; Michlbauer, Alois (SKW Trostberg A.-G., Fed. Rep.
 Ger.). Ger. Offen. DE 3103963 A1 19820819, 10 pp. (German).
 CODEN: GWXXBX. APPLICATION: DE 1981-3103963 19810205.
 AB ClCN is prepd. from **cyanuric chloride** by

vapor-phase, catalytic depolymn. on **activated C** at 620-680° for 10-20 s. The process is dependent on contact time and temp. Thus, reaction for 15 s at 640° gave a reaction mixt. contg. ClCN 84.0, (CN)₂ 5.4, and unreacted C₃Cl₃N₃ 3.2 wt.%, the remainder being Cl.

IT **7440-44-0**, uses and miscellaneous
(activated, catalyst, for **cyanuric chloride**
depolymn. to **cyanogen chloride**)

RN 7440-44-0 HCA

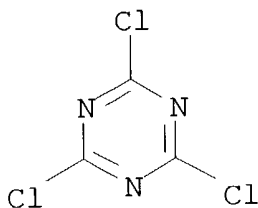
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **108-77-0**
(depolymn. of, for **cyanogen chloride** manuf.,
activated carbon catalyst for)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT **506-77-4P**
(manuf. of, by **cyanuric chloride** depolymn.,
activated carbon catalyst for)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

IC C01C003-00

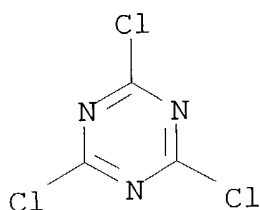
CC 49-8 (Industrial Inorganic Chemicals)

ST **cyanogen chloride** prepn **activated**
carbon; cyanuric chloride depolymn
carbon catalyst

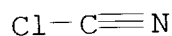
IT Depolymerization catalysts
(**activated carbon**, for **cyanuric**
chloride to **cyanogen chloride**)

IT **7440-44-0**, uses and miscellaneous
(activated, catalyst, for **cyanuric chloride**
depolymn. to **cyanogen chloride**)

- IT 108-77-0
(depolymer. of, for **cyanogen chloride** manuf.,
activated carbon catalyst for)
- IT 506-77-4P
(manuf. of, by **cyanuric chloride** depolymer.,
activated carbon catalyst for)
- L23 ANSWER 4 OF 10 HCA COPYRIGHT 2004 ACS on STN
94:30803 Cyameluric chloride. Gremmelmaier, Claude; Riethmann, Jean
(Ciba-Geigy Corp., USA). U.S. US 4205167 19800527, 3 pp.
(English). CODEN: USXXAM. APPLICATION: US 1979-26262 19790402.
- AB **Cyanuric chloride** (I), I-NCCl mixts., and NCCl
were mixed with O and passed over **active charcoal**
at 200-700° to give cyameluric chloride (II). An air-I mixt.
was passed over **active charcoal** at 400°
to give II.
- IT 108-77-0 506-77-4
(conversion of, to cyameluric chloride, charcoal catalysts for)
- RN 108-77-0 HCA
- CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



- RN 506-77-4 HCA
- CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



- IC C07D403-14
- NCL 544209000
- CC 28-22 (Heterocyclic Compounds (More Than One Hetero Atom))
- ST cyameluric chloride; **cyanuric chloride**
conversion cyameluric chloride; **cyanogen chloride**
conversion cyameluric chloride; charcoal catalyst **cyanuric**
chloride conversion
- IT **Charcoal**
(**activated**, catalysts, for conversion of
cyanuric chloride and **cyanogen**
chloride to cyameluric chloride)
- IT 108-77-0 506-77-4
(conversion of, to cyameluric chloride, charcoal catalysts for)

L23 ANSWER 5 OF 10 HCA COPYRIGHT 2004 ACS on STN

93:97842 **Cyanogen chloride**. Yamamoto, Tadatsugu;
Kodera, Hideaki; Matsumura, Kenji (Asahi Chemical Industry Co.,
Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 55042242 19800325 Showa, 6
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1978-114616
19780920.

AB **Activated C** is impregnated with AlCl_3 and 1 or
more of Mg, Ca, Cr, Mn, Fe, Co, Ni, Cu, and Zn salts in MeOH, EtOH,
or Et₂O simultaneously or successively to carry 15-30% in total but
0.3-0.95 mol fraction of AlCl_3 , and C_2N_2 and Cl are contacted with
the catalyst at 400-500°. **Cyanuric
chloride** is produced without cooling the CNCI . Thus, 10 g
4-8 mesh com. **activated C** (bulk d. 0.485) was
soaked in anhyd. AlCl_3 1.46 and MgCl_2 1.04 g in 30 mL MeOH, and
evapd. to dryness at 100° to carry 12 and 8% but AlCl_3 0.5
mol fraction. When a 3 mL portion was placed in a 7 mm diam. quartz
tube, heated at 400° for 2-3 h in a N stream, and a 1:1.1 mol
ratio mixt. of C_2N_2 and Cl was passed through it at 460° and
1.8 L/h (space velocity 600 h⁻¹), the C_2N_2 conversion was 91%, CNCI
selectivity 98%, its yield 89%, vs. 65 or 54, 93 or 98, and 60 or 53
with AlCl_3 or MgCl_2 only, and 64, 72, and 46 without both.

IT **506-77-4P**
(manuf. of, by cyanogen chlorination, catalyst for)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

$\text{Cl}-\text{C}\equiv\text{N}$

IC C01C003-00

CC 49-8 (Industrial Inorganic Chemicals)

IT 7446-70-0, uses and miscellaneous 7786-30-3, uses and
miscellaneous

(chlorination catalyst, for **cyanogen chloride**
manuf.)

IT **506-77-4P**
(manuf. of, by cyanogen chlorination, catalyst for)

L23 ANSWER 6 OF 10 HCA COPYRIGHT 2004 ACS on STN

93:97839 **Cyanogen chloride**. Yamamoto, Tadatsugu;
Kodera, Hideaki; Matsumura, Kenji (Asahi Chemical Industry Co.,
Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 55020224 19800213 Showa, 6
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1978-91541
19780728.

AB (CN)₂ and Cl₂ are reacted at 300-550° in the presence of
activated C carrying 15-40% AlCl_3 , $\text{Al}(\text{NO}_3)_3$, or
 $\text{Al}_2(\text{SO}_4)_3$ as catalyst. Synthesis of **cyanuric**

chloride is followed immediately without cooling of ClCN obtained. Thus, 2.5 g anhyd. AlCl₃ was dissolved in 30 mL Et₂O, soaked with 10 g dried 4-8 mesh **activated C** of bulk d. 0.485, and dried at 100° to carry 20% AlCl₃, and a 3-mL portion was placed in a 7-mm diam. quartz tube and heated at 400° for 2-3 h in a N stream. When a 1:1.1 mixt. of (CN)₂ and Cl was passed over at space velocity 600 h⁻¹ and 400°, 460°, 490°, or 530°, the (CN)₂ conversion was 75, 92, 96, or 98; CNCl selectivity was 95, 93, 98, or 97, and its yield 71, 85, 94, or 95%, vs. 21, 64, 80, or 98; 71, 72, 89, or 95; and 15, 46, 71, or 93% without AlCl₃.

IT 506-77-4P
 (manuf. of, aluminum chloride catalysts for)
 RN 506-77-4 HCA
 CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

IC C01C003-00
 CC 49-8 (Industrial Inorganic Chemicals)
 ST **cyanogen chloride** manuf; aluminum chloride catalyst; chlorination cyanogen catalyst
 IT 506-77-4P
 (manuf. of, aluminum chloride catalysts for)

L23 ANSWER 7 OF 10 HCA COPYRIGHT 2004 ACS on STN
 85:7889 **Cyanogen chloride**. Durrell, William S.; Eckert, Robert J., Jr. (Ciba-Geigy Corp., USA). U.S. US 3944656 19760316, 3 pp. (English). CODEN: USXXAM. APPLICATION: US 1974-432266 19740110.

AB A process for prepg. ClCN comprises reacting HCN with Cl in 25-75% molar excess at 250-90° in the presence of a low-**activity C** catalyst having a CCl₄ activity of 1-10. The catalyst contact time is 1-5 sec. The reaction produces a gas mixt. contg. ClCN, HCl, Cl, and small amts. of **cyanuric chloride** and HCN. The mixt. is cooled to remove the **cyanuric chloride** and then treated with H₂O to remove HCl and HCN. The remaining gas is fractionated to sep. ClCN and Cl.

IT 7440-44-0, uses and miscellaneous
 (catalysts, for chlorination of hydrocyanic acid)
 RN 7440-44-0 HCA
 CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT 506-77-4P
(manuf. of, from chlorine and hydrocyanic acid, carbon catalyst
for)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C01B
NCL 423379000
CC 49-8 (Industrial Inorganic Chemicals)
ST **cyanogen chloride**
IT 7440-44-0, uses and miscellaneous
(catalysts, for chlorination of hydrocyanic acid)
IT 506-77-4P
(manuf. of, from chlorine and hydrocyanic acid, carbon catalyst
for)

L23 ANSWER 8 OF 10 HCA COPYRIGHT 2004 ACS on STN

84:92317 **Cyanogen chloride**. Gruber, Wilhelm;
Schnierle, Franz; Schroeder, Guenter (Rohm G.m.b.H., Fed. Rep.
Ger.). Ger. DE 2442161 19751016, 3 pp. (German). CODEN: GWXXAW.
APPLICATION: DE 1974-2442161 19740903.
AB ClCN is prep'd. by passing 5000-8000 l. (measured at room temp.) per
hr. per l. catalyst of an .apprx. equimolar (preferably with
.apprx.10% excess of Cl) mixt. of (CN)2 and Cl over an
active C catalyst at 550-750°. Per l. of
active C, > 18 kg ClCN/hr can be obtained, with a
yield > 90%. When ClCN is prep'd. in a 1st stage, **cyanuric**
chloride can be prep'd. by trimerization in a 2nd stage.

IT 506-77-4P
(manuf. of, from chlorine and cyanogen)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C01C
CC 49-8 (Industrial Inorganic Chemicals)
ST **cyanogen chloride** manuf; chlorination cyanogen
IT 506-77-4P
(manuf. of, from chlorine and cyanogen)
IT 460-19-5
(reaction of, with chlorine, **cyanogen chloride**
by)
IT 7782-50-5, reactions

(with cyanogen, **cyanogen chloride** by)

L23 ANSWER 9 OF 10 HCA COPYRIGHT 2004 ACS on STN

64:84627 Original Reference No. 64:15901a-b **Cyanuric chloride**. Zinsstag, Christoph; Gentili, Renato (Lonza Ltd.). CH 396020 19660114, 1 p. (Unavailable). APPLICATION: CH 19610906.

AB **Cyanuric chloride** has been prep'd. by heating polymeric ClCN, especially the tetramer, at 400-50° at atm. pressure in the presence of **activated charcoal**.

IT **506-77-4, Cyanogen chloride**
(polymerization of, to **cyanuric chloride** by charcoal catalyst)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

NCL 12P; 10-05

CC 38 (Heterocyclic Compounds (More Than One Hetero Atom))

IT Catalysts and Catalysis
(in polymerization, of CNCl to **cyanuric chloride**, charcoal as)

IT **506-77-4, Cyanogen chloride**
(polymerization of, to **cyanuric chloride** by charcoal catalyst)

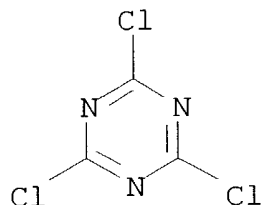
L23 ANSWER 10 OF 10 HCA COPYRIGHT 2004 ACS on STN

62:80122 Original Reference No. 62:14171d-f Trimerization of **cyanogen chloride**. Landau, M. A.; Malinin, N. K. Zhurnal Fizicheskoi Khimii, 39(3), 779 (Russian) 1965. CODEN: ZFKHA9. ISSN: 0044-4537.

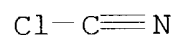
AB Homogeneous trimerization of **cyanogen chloride**
(I) to cyanur chloride (II) was accelerated by the addn. of II to 1-g. samples of I contained in quartz tubes and converted by heating in an autoclave in the presence of 0.015 g. water acting as catalyst. After a reaction time of 60 min. at 240° (time of heating 70 min.) 89% I was converted (yield of II 69% by wt. with respect to the amt. of I that reacted) upon addn. of 0.1 g. II, and 100% I was converted (yield of II 82-90%) upon addn. of 0.25-1.0 g. II vs. a conversion of 55% (yield of II 55%) in a reaction under the same conditions without addn. of II. After a reaction time of 20 min. at 240° (time of heating 40 min.), the amt. of I converted was 0 without addn. of II, 27% on addn. of 0.1 g. II, and 75% on addn. of 0.5 g. II. One may assume that II accelerates the reaction by acting as a matrix for 3 activated mols. of I. In heterogeneous trimerization of vapor of I on **activated**

C, preliminary treatment of C with vapor of II also increased the rate of conversion (Japan. 2282-3('59), CA 54, 11414d).

IT 108-77-0, s-Triazine, 2,4,6-trichloro-
 (prepn. by ClCN trimerization, water catalysts in)
 RN 108-77-0 HCA
 CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4, Cyanogen chloride
 (trimerization of, to 2,4,6-trichloro-s-triazine with water catalysts)
 RN 506-77-4 HCA
 CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



CC 14 (Inorganic Chemicals and Reactions)
 IT 108-77-0, s-Triazine, 2,4,6-trichloro-
 (prepn. by ClCN trimerization, water catalysts in)
 IT 506-77-4, Cyanogen chloride
 (trimerization of, to 2,4,6-trichloro-s-triazine with water catalysts)

=> d his 129-

FILE 'HCA' ENTERED AT 20:01:15 ON 09 MAR 2004

L29 29 S (CLCN OR CNCL) (3A) (TRIMER? OR CYCLOTRIMER?)
 L30 14 S L29 AND L9
 L31 7 S L30 NOT (L21 OR L23 OR L22 OR L24)

=> d 131 1-7 cbib abs hitstr ind

L31 ANSWER 1 OF 7 HCA COPYRIGHT 2004 ACS on STN
 84:152847 Purification of cyanogen chloride. Geiger, Friedhelm;
 Heimberger, Werner; Schmitt, Hermann; Schreyer, Gerd (Deutsche Gold-
 und Silber-Scheideanstalt vorm. Roessler, Fed. Rep. Ger.). Ger.

Offen. DE 2363867 19750904, 7 pp. (German). CODEN: GWXXBX.
APPLICATION: DE 1973-2363867 19731221.

AB In a process for the purifn. of CNCl and for increasing the service life of the **active C** in the subsequent **trimerization** of CNCl, the CNCl prepd. by making to react HCN with Cl in the presence of H₂O is passed at 20-100° over granulated γ -Al₂O₃ having an alkali or optionally also and alk. earth content of $\leq 3\%$ before entering the trimerization reactor. The γ -Al₂O₃ is preferably regenerated by heating it to 2-600° and passing air therethrough.

IC C01C
CC 49-8 (Industrial Inorganic Chemicals)
ST cyanogen chloride purifn
IT 1344-28-1, uses and miscellaneous
(purifn. by, of cyanogen chloride)
IT 506-77-4P
(purifn. of, with aluminum oxide)

L31 ANSWER 2 OF 7 HCA COPYRIGHT 2004 ACS on STN
84:152846 Purification of cyanogen chloride. Geiger, Friedhelm; Heimberger, Werner; Schreyer, Gerd (Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, Fed. Rep. Ger.). Ger. Offen. DE 2363866 19750904, 7 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1973-2363866 19731221.

AB In a process for the purifn. of ClCN to increase the service life of the **active C** in the subsequent **trimerization** of CNCl, the CNCl prepd. by making to react HCN with Cl in the presence of H₂O is passed over a granular commercial Na Al silicate or over mol. sieves of the mordenite type at 20-100° before entering the trimerization reactor. The crude ClCN may contain Cl. The mol. sieves are preferably regenerated at 200-600° with a stream of air.

IC C01C
CC 49-8 (Industrial Inorganic Chemicals)
ST cyanogen chloride purifn
IT Zeolites
(purifn. by, of cyanogen chloride)
IT 506-77-4P
(purifn. of, with zeolites)

L31 ANSWER 3 OF 7 HCA COPYRIGHT 2004 ACS on STN
80:125373 Regeneration of deactivated carbon catalyst. Suryanarayana, Yelagondahally S.; Reid, Luther J., Jr. (Ciba-Geigy Corp.). U.S. US 3781287 19731225, 2 pp. (English). CODEN: USXXAM. APPLICATION: US 1971-142392 19710511.

AB The **active C** catalyst used in **trimerization** of CNCl to cyanuric acid was

regenerated in situ with Cl gas at .apprx.500° for varying times. The activity increased from 1.6 to 5.0 lb CNCl conversion/hr.

IT 7440-44-0, uses and miscellaneous
(catalysts, for trimerization of cyanogen chloride, regeneration of)
RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IC C07D
NCL 260248000C
CC 67-1 (Catalysis and Reaction Kinetics)
Section cross-reference(s): 1
ST trimerization cyanogen chloride carbon catalyst; regeneration carbon catalyst chlorine
IT Trimerization catalysts
(carbon, for cyanogen chloride, regeneration of)
IT 7440-44-0, uses and miscellaneous
(catalysts, for trimerization of cyanogen chloride, regeneration of)
IT 7782-50-5, uses and miscellaneous
(regeneration by, of carbon catalyst for cyanogen chloride trimerization)
IT 506-77-4
(trimerization of, reactivation of carbon catalyst for)

L31 ANSWER 4 OF 7 HCA. COPYRIGHT 2004 ACS on STN

80:28858 Modeling of processes with variable catalyst activity using a hybrid computer. Markaryan, A. G.; Sidorov, V. N.; Matros, Yu. Sh. (USSR). Upravlyaemye Sist., No. 10, 90-5 From: Ref. Zh., Khim. 1973, Abstr. No. 8I215 (Russian) 1971.

AB Modeling of a series of catalytic processes with a hybrid computer was accomplished. In steady-state catalytic processes, the machine times were reduced by 1-2 order of magnitude as compared with the digital computer with total soln. error 0.4-0.6%. A procedure using hybrid computer is given for modeling heterogeneous catalytic processes with a variable catalytic activity, based on the method of straight lines under the following conditions: (1) the rate of change of the catalyst activity is significantly lower than the reaction rate; the process in the internal catalyst layer is under steady state; (2) linear flow rate of the reacting mixt. with respect to the reaction rate; (3) longitudinal mass and heat transfer on account of the effective diffusion and thermal cond. is unessential; (4) concn. and temp. gradients in the radial direction are small; and (5) the input parameters (temp., compn., pressure)

change with time. Math. description of an unsteady-state process is given in a vector form. The analog computer is feasible for integration and multiplication, and a digital computer is feasible for multiplication, division, logic operations, and calcn. of nonlinearities. **Trimerization of CNCl on active carbon** was studied, and concn. and temp. profiles along the length of the reactor are given.

CC 48-8 (Unit Operations and Processes)

ST hybrid computer model catalysis

IT Simulation model

(of reactions, with variable catalyst activities, with hybrid computer)

IT Reaction

(simulation of catalytic, with variable catalyst activity, with hybrid computer)

L31 ANSWER 5 OF 7 HCA COPYRIGHT 2004 ACS on STN

72:4811 Recovery of cyanogen chloride, chlorine, and hydrochloric acid from the gases accumulated during the production of cyanogen chloride and its trimer. Riethmann, Jean A.; Scheck, Leo (Agrispat, S. A.). Ger. Offen. DE 1900972 19690904, 13 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1969-1900972 19690109.

AB Dry HCN and Cl react over an **active carbon**

catalyst at 350° to form (ClCN)₃ through the intermediate formation of **ClCN** followed by **trimerization**.

The recovery of HCl in high concn. from the residual gases and the recycle of Cl and ClCN are important economic problems. After condensation of (ClCN)₃, the residual gases contg. HCl, Cl, and ClCN (65:33:2 by vol.) were freed from moisture and other polar solvents and then were liquefied by cooling in a fractionating plant. Fractional distn. of the liquefied gases at normal pressure and at -40 to -20° sep. completely liq. HCl from the ClCN-Cl mixt. The ClCN-Cl mixt. was then recycled for (ClCN)₃ production. It is long known that HCl and Cl strongly catalyze the polymn. of ClCN to (ClCN)₃ at low temp. The absence of H₂O is thought to be the reason for the absence of polymn. during the fractional distn. of the mixt. In an example, the residual gases (HCl 50, Cl 48, and ClCN 2 parts by wt.) of the catalytic production of (ClCN)₃ was fed to the distn. column and fully condensed by cooling to -100 to -103° in a heat exchanger using difluorochloromethane under .apprx.15 mm pressure. The liq. collecting in the distn. still was heated to -31 to -25°. The HCl contg. 0-2.5 parts Cl was taken from the top and liq. contg. HCl .apprx.2.5, Cl 46.5 and ClCN 2 parts was taken continuously from the bottom of the column. (ClCN)₃ was absent in the distillate as well as in the liq. in the still.

IC C01C

CC 49 (Industrial Inorganic Chemicals)

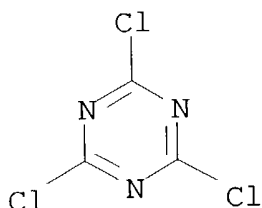
ST cyanogen chloride prodn; chlorine prodn; hydrochloric acid prodn;

- polymn cyanogen chloride
- IT 14948-61-9P
(from chlorine-hydrocyanic acid reaction)
- IT 506-77-4P 7647-01-0P, preparation 7782-50-5P, preparation
(recovery of, in cyanogen chloride trimer manuf.)
- L31 ANSWER 6 OF 7 HCA COPYRIGHT 2004 ACS on STN
66:85754 Preparation of cyanuric chloride. Erbits, Frigyes; Nadasy, Miklos; Raskai, Bela Nehezvegyipari Kutato Intezet Kozlemenyei, 3(1-2), 1-8 (Hungarian) 1966. CODEN: NEKUAB. ISSN: 0505-3919.
- AB Prepn. of cyanuric chloride in two steps, i.e., (a) production of ClCN by chlorination of HCN and (b) **trimerization** of ClCN by using **activated carbon** catalyst treated with BaCl₂, CaCl₂, MgCl₂, CuCl₂, SrCl₂ or KCl is described. Best results (84-95% yield) were obtained at a reaction temp. of 320-450° and a ClCN flow velocity of 1.36 cc./sec., using KCl, CaCl₂, or SrCl₂ **activated carbon** as the catalyst.
- CC 28 (Heterocyclic Compounds (More Than One Hetero Atom))
- IT 108-77-0P
(prepn. of)
- L31 ANSWER 7 OF 7 HCA COPYRIGHT 2004 ACS on STN
62:74280 Original Reference No. 62:13163a-c Cyanuric chloride. Foulletier, Louis; Markiewicz, Michel (Societe d'Electro-Chimie, d'Electro-Metallurgie et des Acieries Electriques d'Ugine). DE 1186465 19650204, 3 pp. (Unavailable). PRIORITY: FR 19611028.
- AB Cyanuric chloride was prepd. by the catalytic **trimerization** of ClCN, and if desired, while simultaneously producing ClCN from Cl and HCN in the vapor phase at 250-450° over **activated C**. An excess of free Cl, (0.5 mole Cl per mole ClCN) was used. E.g., ClCN was prepd. by reacting excess Cl with HCN in the presence of **activated C** at 200-50° and at a high reactor velocity (100-200 l./hr./l catalyst). After removing the HCl by washing with H₂O, the ClCN and excess Cl were dried over CaCl₂ and passed through fresh **activated C**. At 470, 385, and 370°, resp., and at a space velocity (l./hr./l. catalyst) of 70, 67, and 62, resp., and a ratio of Cl₂: ClCN of 0.73, 0.84, and 0.79, the yield of (CNCl)₃ was 25, 74, and 83%. The catalyst showed no loss of activation after a reaction life of 200 hrs. In considering the equation: 3 ClCN → (ClCN)₃, it is seen that the use of 2 reactors placed in series with a (ClCN)₃ condenser placed between them is more effective than a single reactor. It is seen from the above results that it is advantageous to use the lowest possible temp. This process makes use of this optimum condition, since the catalyst remains active at these temps., but in other known processes this is not the case.

IC C07D
CC 38 (Heterocyclic Compounds (More Than One Hetero Atom))
IT 108-77-0, s-Triazine, 2,4,6-trichloro-
(prepn. of)

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L22 ANSWER 1 OF 25 HCA COPYRIGHT 2004 ACS on STN
137:354702 Trimerization and condensation apparatus for the preparation
of **cyanuric chloride** from **cyanogen
chloride**. Puschner, Kurt; Schauhoff, Stephanie (Degussa
A.-G., Germany). Eur. Pat. Appl. EP 1256577 A1 20021113, 8 pp.
DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI,
LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR.
(German). CODEN: EPXXDW. APPLICATION: EP 2002-9995 20020504.
PRIORITY: DE 2001-10123072 20010511.
AB A trimerization and condensation app. as well as a means for the
prepn. of **cyanuric chloride** from
cyanogen chloride is presented. An app. schematic
is presented.
IT **108-77-0P, Cyanuric chloride**
RL: EPR (Engineering process); IMF (Industrial manufacture); PEP
(Physical, engineering or chemical process); PYP (Physical process);
PREP (Preparation); PROC (Process)
(trimerization and condensation app. for the prepn. of
cyanuric chloride from **cyanogen
chloride**)
RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT **506-77-4, Cyanogen chloride**
RL: EPR (Engineering process); PEP (Physical, engineering or
chemical process); PYP (Physical process); RCT (Reactant); PROC
(Process); **RACT (Reactant or reagent)**
(trimerization and condensation app. for the prepn. of
cyanuric chloride from **cyanogen
chloride**)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

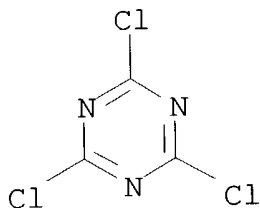
- IC ICM C07D251-28
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 28, 47, 48
- ST **cyanuric chloride** manuf app; **cyanogen chloride** trimerization app; sublimation app **cyanuric chloride** manuf; condensation app **cyanuric chloride** manuf; quench column app **cyanuric chloride** manuf
- IT Trimerization
(app.; trimerization and condensation app. for the prepn. of **cyanuric chloride** from **cyanogen chloride**)
- IT Columns and Towers
(quench; trimerization and condensation app. for the prepn. of **cyanuric chloride** from **cyanogen chloride** using)
- IT Evaporators
(sublimation app.; trimerization and condensation app. for the prepn. of **cyanuric chloride** from **cyanogen chloride**)
- IT Condensers
Trimerization
(trimerization and condensation app. for the prepn. of **cyanuric chloride** from **cyanogen chloride**)
- IT **108-77-0P, Cyanuric chloride**
RL: EPR (Engineering process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PYP (Physical process); PREP (Preparation); PROC (Process)
(trimerization and condensation app. for the prepn. of **cyanuric chloride** from **cyanogen chloride**)
- IT **506-77-4, Cyanogen chloride**
RL: EPR (Engineering process); PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); **RACT (Reactant or reagent)**
(trimerization and condensation app. for the prepn. of **cyanuric chloride** from **cyanogen chloride**)
- L22 ANSWER 2 OF 25 HCA COPYRIGHT 2004 ACS on STN
130:169804 Preparation of **cyanuric chloride** by a gas-phase one-stage method. Yu, Wuyuan; Nie, Rongnan; Wu, Wenbin; Zeng, Zimin; Xu, Rencui; Ni, Zhaoshun; Liu, Qing; Huang, Yuqin;

Chen, Erkang; Zhu, Kuinian; Jiang, Yinrui; Fu, Zingjian; Li, Yuanping; Jin, Mingchang; Wang, Zhangmao; Zhong, Xinzhaoh; Mao, Longjiang; Li, Wenzheng; Bai, Rong (Chenguang Chemical Inst., Ministry of Chemical Industry, Peop. Rep. China). Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1122328 A 19960515, 9 pp. (Chinese). CODEN: CNXXEV. APPLICATION: CN 1994-111956 19941104.

- AB A method includes chlorination of HCN and polymn. of CNCl without sepn., and the reactions occur in 2 fixed-bed shell and tube reactors, resp. The chlorination reactor is packed with inert ceramic rings at 350-450° and the polymn. reactor includes **activated carbon** as the catalyst at 300-400°. A tail gas is treated with a dust collector to remove the residual **cyanuric chloride**, an absorber to remove HCl, and an alkali treatment app. to remove CNCl, HCl, and Cl.
- IT **7440-44-0, Activated carbon**, uses
 RL: CAT (Catalyst use); USES (Uses)
 (**activated**; chlorination of hydrogen cyanide and polymn. for manuf. of **cyanuric chloride**)
- RN 7440-44-0 HCA
 CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

- IT **108-77-0P, Cyanuric chloride**
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
 (chlorination of hydrogen cyanide and polymn. for manuf. of **cyanuric chloride**)
- RN 108-77-0 HCA
 CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



- IT **506-77-4P, Chlorine cyanide**
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); **RACT (Reactant or reagent)**
 (chlorination of hydrogen cyanide and polymn. for manuf. of **cyanuric chloride**)
- RN 506-77-4 HCA
 CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

- IC ICM C07C251-28
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 23
ST **activated carbon** catalyst polymn
cyanogen chloride; hydrogen cyanide chlorination
polymn **cyanuric chloride**
IT Chlorination
Trimerization catalysts
(chlorination of hydrogen cyanide and polymn. for manuf. of
cyanuric chloride)
IT Reactors
(fixed-bed; chlorination of hydrogen cyanide and polymn. for
manuf. of **cyanuric chloride**)
IT Reactors
(shell-and-tube; chlorination of hydrogen cyanide and polymn. for
manuf. of **cyanuric chloride**)
IT **7440-44-0, Activated carbon**, uses
RL: CAT (Catalyst use); USES (Uses)
(**activated**; chlorination of hydrogen cyanide and
polymn. for manuf. of **cyanuric chloride**)
IT **108-77-0P, Cyanuric chloride**
RL: IMF (Industrial manufacture); PEP (Physical, engineering or
chemical process); PREP (Preparation); PROC (Process)
(chlorination of hydrogen cyanide and polymn. for manuf. of
cyanuric chloride)
IT **506-77-4P, Chlorine cyanide**
RL: IMF (Industrial manufacture); RCT (Reactant); PREP
(Preparation); **RACT (Reactant or reagent)**
(chlorination of hydrogen cyanide and polymn. for manuf. of
cyanuric chloride)
IT 74-90-8, Hydrogen cyanide, reactions 7782-50-5, Chlorine,
reactions
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(chlorination of hydrogen cyanide and polymn. for manuf. of
cyanuric chloride)

L22 ANSWER 3 OF 25 HCA COPYRIGHT 2004 ACS on STN
127:244131 Theoretical determination of potential hazards in the
handling of CK and AC munitions. Rice, Betsy M.; Pai, Sharmila V.;
Chabalowski, Cary F. (U. S. Army Res. Lab., Aberdeen Proving Ground,
MD, 21005-5066, USA). Army Science Conference: Award Winning
Papers, 20th, Norfolk, Va., June 24-27, 1996, Meeting Date 1996,
41-45. Editor(s): Chait, Richard. World Scientific: Singapore,
Singapore. (English) 1997. CODEN: 65DRA7.

AB Quantum mech. calcns. [ab initio and d. functional theory (DFT)] were preformed to investigate reaction of mechanisms for formation and decompn. of the six-membered rings C3N3X3, where X denotes Cl or H. C3N3Cl3 (**cyanuric chloride**) and C3N3H3 (sym-triazine) are the polymn. products of agents CK (ClCN) and AC (HCN). The process of the polymn. to the trimer species of CK and AC has long been rumored to be highly exothermic and thought to be the cause of explosions of cylinders contg. these agents. The calcns. presented here det. energy release upon reaction, activation barriers and details of the reaction mechanisms for the polymn. of these agents. The calcns. investigate concerted triple assocn. and step-wise addn. reactions leading to the trimers, and provide information on the low-energy pathway to polymn. Ab initio MP2 and non-local DFT geometry optimizations for crit. points on the CK and AC potential energy surfaces were calcd. with the 6-311 + G* and cc-pVTZ basis sets, resp. The MP2 calcns. were followed by QCISD(T) energy refinements for the AC system. Good agreement with expts. is found for the predicted geometries and frequencies of sym-triazine, HCN, ClCN and **cyanuric chloride**. All calcns. indicate that CK and AC have similar features on the potential energy surfaces for the trimerization reactions. All calcns. show that the lowest-energy formation mechanism for trimerization is the concerted triple assocn. In both chem. systems, a weakly-bound (XCN)3 cluster is a pre-reaction intermediate to the trimerization. This reduced entropic hindrance to the unusual concerted triple assocn. of the CK and AC mols. Both systems have a large energy release upon trimerization and similar barriers to activation of the reactions. The energy available to the surrounding system upon crossing the reaction barrier is sufficient to initiate chain reactions. Preliminary studies on polymn. reactions of AC and CK to the tetramers predict significant energy release that could initiate addnl. reactions.

IT 506-77-4, **Cyanogen chloride**

RL: MSC (Miscellaneous); RCT (Reactant); **RACT (Reactant or reagent)**

(potential hazards in handling of **cyanogen chloride** and hydrogen cyanide munitions)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

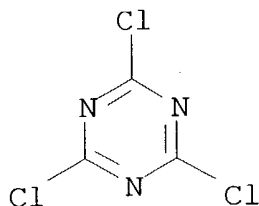
IT 108-77-0P, **Cyanuric chloride**

RL: SPN (Synthetic preparation); PREP (Preparation)

(potential hazards in handling of **cyanogen chloride** and hydrogen cyanide munitions)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



CC 4-3 (Toxicology)

IT Explosives

Polymerization

Polymerization enthalpy

Potential barrier

(potential hazards in handling of **cyanogen chloride** and hydrogen cyanide munitions)

IT 74-90-8, Hydrogen cyanide, reactions 506-77-4,

Cyanogen chloride

RL: MSC (Miscellaneous); RCT (Reactant); **RACT (Reactant or reagent)**

(potential hazards in handling of **cyanogen chloride** and hydrogen cyanide munitions)

IT 108-77-0P, **Cyanuric chloride**

290-87-9P, sym-Triazine

RL: SPN (Synthetic preparation); PREP (Preparation)

(potential hazards in handling of **cyanogen chloride** and hydrogen cyanide munitions)

L22 ANSWER 4 OF 25 HCA COPYRIGHT 2004 ACS on STN

127:110559 Kinetics of chlorination and trimerization in synthesis of cyanuryl chloride. Wang, Zhangmao; Jiang, Guangguan; Lu, Dewei; Wu, Wenbin; Jiang, Yinrui; Jin, Mingchang; Liu, Qing (Dep. Chem. Eng., Zhejiang Univ., Hangzhou, 310027, Peop. Rep. China). Huaxue Fanying Gongcheng Yu Gongyi, 13(2), 165-172 (Chinese) 1997. CODEN: HFGGEU. ISSN: 1001-7631. Publisher: Zhejiangsheng Chuban Duiwai Maoyi Gongsì.

AB A nonisothermal packed bed reactor has been used to study the kinetics of chlorination and trimerization in synthesis of cyanuryl chloride. The chlorination reaction of hydrogen cyanide is a homogeneous gas phase, while the trimerization of chloro-cyanogen adsorbed on the surface of **active carbon** catalyst is the controlling step of G/S catalytic reaction. The macrokinetics equation of chlorination reaction is $(-r_A)_1 = 2.45 \times 10^7 \exp(-2.90 \times 10^4/RT)C_A$. The macrokinetics equation of the trimerization reaction is $(-r_A)_2 = k [p_{A3} - p_R/k_p]/[1 + k_A p_A + k_R p_R]^3$. In the above equations the parameters are: $k = 4.0 \times 10^7 \exp(-4.35 \times 10^4/RT)$, $K_p = 6.76 \times 10^{-23} \exp(3.52 \times 10^5/RT)$, $K_A = 4.0 \times 10^3$

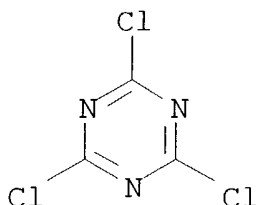
$\exp(-3.39 \times 104/RT)$, $KR = 1.05 \times 103 \exp(-5.02 \times 104/RT)$.

IT **108-77-0P, Cyanuryl chloride**

RL: IMF (Industrial manufacture); PREP (Preparation)
(kinetics of trimerization of **cyanogen chloride**
in synthesis of cyanuryl chloride)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



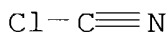
IT **506-77-4P, Cyanogen chloride**

RL: PEP (Physical, engineering or chemical process); RCT (Reactant);
SPN (Synthetic preparation); PREP (Preparation); PROC (Process);
RACT (Reactant or reagent)

(kinetics of trimerization of **cyanogen chloride**
in synthesis of cyanuryl chloride)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)

IT **108-77-0P, Cyanuryl chloride**

RL: IMF (Industrial manufacture); PREP (Preparation)
(kinetics of trimerization of **cyanogen chloride**
in synthesis of cyanuryl chloride)

IT **506-77-4P, Cyanogen chloride**

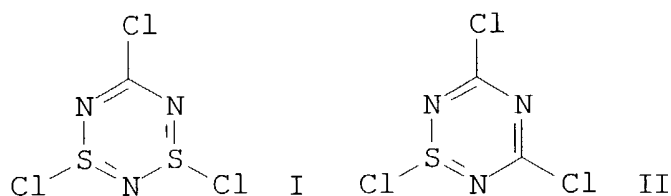
RL: PEP (Physical, engineering or chemical process); RCT (Reactant);
SPN (Synthetic preparation); PREP (Preparation); PROC (Process);
RACT (Reactant or reagent)

(kinetics of trimerization of **cyanogen chloride**
in synthesis of cyanuryl chloride)

L22 ANSWER 5 OF 25 HCA COPYRIGHT 2004 ACS on STN

120:190766 Chlorothiatriazines. Chen, Shan Jia; Behrens, Ulrich;
Fischer, Eberhard; Mews, Ruediger; Pauer, Frank; Sheldrick, George
M.; Stalke, Dietmar; Stohrer, Wolf Dieter (Inst. Anorg. Phys. Chem.,
Univ. Bremen, Bremen, D-28334, Germany). Chemische Berichte,
126(12), 2601-7 (German) 1993. CODEN: CHBEAM. ISSN: 0009-2940.

GI



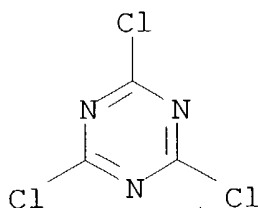
AB From trichlorotrithiatiazine (ClSN)₃ and **cyanogen chloride** (ClCN) 1,3,5-trichloro-1,3,2,4,6-dithiatiazine (ClCN)(ClSN)₂ (I) was prepd. in 26% yield. I reacts slowly further with excess **cyanogen chloride** to give thiatiazine (ClSN)₂(ClCN) (II) and trichlorotriazine (ClCN)₃. A mechanism for the (ClSN)/(ClCN) exchange is proposed. The structures of I and II were detd. by x-ray diffraction. The bonding situation in the system (ClSN)_n(ClCN)_{3-n} (n = 0-3) is discussed.

IT **108-77-0P**, 2,4,6-Trichloro-s-triazine

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. and crystal structure)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)

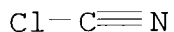


IT **506-77-4**, **Cyanogen chloride**

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reactant for chlorodithiatiazine or chlorotriazine)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



CC 22-5 (Physical Organic Chemistry)
Section cross-reference(s): 28

IT Addition reaction

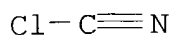
Cycloaddition reaction

Elimination reaction

Ring contraction

(chlorodithiatiazine and chlorodithiatiazine from

- cyanogen chloride** and trichlorotrithiatriazine)
- IT 108-77-0P, 2,4,6-Trichloro-s-triazine 58589-34-7P,
1λ4-1,2,4,6-Thiatriazine, 1,3,5-trichloro- 152172-19-5P,
1,3,5-Trichloro-1,3,2,4,6-dithiatriazine
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. and crystal structure)
- IT 85175-36-6P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. from dithiadiazolyl chloride and **cyanogen chloride**)
- IT 506-77-4, **Cyanogen chloride** 5964-00-1,
Trichlorotrithiatriazine
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reactant for chlorodithiatriazine or chlorotriazine)
- IT 17178-58-4, Thiazyl chloride ((SN)Cl)
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reactant, cyclization fo dithiadiazolyl chloride with **cyanogen chloride**)
- L22 ANSWER 6 OF 25 HCA COPYRIGHT 2004 ACS on STN
114:62125 Preparation of **cyanuric chloride** from
cyanogen chloride. Fujimori, Hiroshi; Watanabe,
Mio; Takahashi, Shuichi (Kyowa Gas Chemical Industry Co., Ltd.,
Japan). Jpn. Kokai Tokkyo Koho JP 02231479 A2 19900913 Heisei, 3
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1989-51281
19890303.
- AB In prepn. of **cyanuric chloride** (I) from gaseous
ClCN in the presence of **activated C** and
≥0.5% chlorinating agents, wet gaseous ClCN was pretreated
with anhyd. CaCl₂ with ≥95% purity to extend catalyst life.
Steam-satd. gaseous ClCN (water content 2 mol%) was passed through 3
consecutive dehydrating towers packed with CaCl₂ with 98.5% purity
and the dehydrated ClCN (water content 0.1-0.2 mol%) was fed to a
column packed with **activated C** to give I at
≥98% conversion and catalyst life ≥9000 h, vs. 95-96%
and 300-800 h, resp., for a control using porous CaCl₂ with 90-92%
purity.
- IT 506-77-4P, **Cyanogen chloride**
RL: RCT (Reactant); PREP (Preparation); **RACT (Reactant or reagent)**
(drying and trimerization of, **cyanuric chloride**
from)
- RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

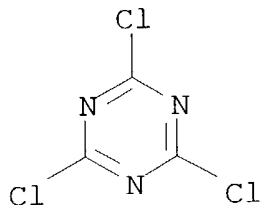


IT 108-77-0P, **Cyanuric chloride**

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by trimerization of dried **cyanogen chloride**)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC ICM C07D251-28

CC 28-19 (Heterocyclic Compounds (More Than One Hetero Atom))

ST **cyanuric chloride; cyanogen**

chloride trimerization; calcium chloride drying
cyanogen chloride

IT 506-77-4P, **Cyanogen chloride**

RL: RCT (Reactant); PREP (Preparation); **RACT (Reactant or reagent)**

(drying and trimerization of, **cyanuric chloride**
from)

IT 10043-52-4, Calcium chloride, uses and miscellaneous

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(drying by, of **cyanogen chloride**, in prepn.
of **cyanuric chloride**)

IT 108-77-0P, **Cyanuric chloride**

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by trimerization of dried **cyanogen chloride**)

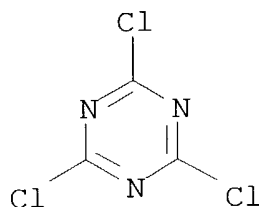
L22 ANSWER 7 OF 25 HCA COPYRIGHT 2004 ACS on STN

106:69123 Apparatus for manufacture of solid **cyanuric**

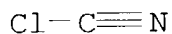
chloride. Klima, Hubertus (SKW Trostberg A.-G., Fed. Rep. Ger.). Ger. Offen. DE 3514840 A1 19861030, 9 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1985-3514840 19850424.

AB Solid **cyanuric chloride** (I) is prepd. from the trimerization of CNCl, where I vapors are added to the bottom of an app. with an inert gas stream (velocity >80 m/s, -80°-+100°) causing I vapors to condense and to leave the app. as I powder (d. <800 kg/m³); the inert gas is removed through an exit in the side of the app. Thus, the described reactor was fed 100 parts/h I and 50 parts/h of an inert gas. The temp. of the entering inert gas stream was 20°, and its velocity was 330 m/s. The d. of obtained I powder was 760 kg/m³.

IT 108-77-0P, **Cyanuric chloride**
RL: PREP (Preparation)
(powd., manuf. of, from trimerization of **cyanogen chloride**)
RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4, **Cyanogen chloride**
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, in **cyanuric chloride** manuf.)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IC ICM C07D251-28
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 28
ST app manuf **cyanuric chloride** powder;
cyanogen chloride trimerization **cyanuric chloride**; condensation app **cyanuric chloride** vapor
IT Condensation, physical
(app. for, of **cyanuric chloride** vapor)
IT Trimerization
(of **cyanogen chloride**, in manuf. of **cyanuric chloride**)
IT 108-77-0P, **Cyanuric chloride**
RL: PREP (Preparation)
(powd., manuf. of, from trimerization of **cyanogen chloride**)
IT 506-77-4, **Cyanogen chloride**
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, in **cyanuric chloride** manuf.)

cyanuric chloride. (Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, Fed. Rep. Ger.). Belg. BE 879185 19800403, 13 pp. (French). CODEN: BEXXAL. APPLICATION: BE 1979-46964 19791003.

AB Residual gases were introduced, at 1-5 bars, into an app. which is described, the gases were treated with HCN in the app. at 0-100° to give ClCN, and the ClCN obtained was removed and utilized in the prodn. of **cyanuric chloride**.

IT **506-77-4P**

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);
RACT (Reactant or reagent)
(prepn. and cyclotrimerization of)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

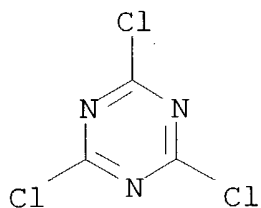


IT **108-77-0P**

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by cyclotrimerization of **cyanogen chloride**, recycling of gases from)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))

ST **cyanuric chloride; cyanogen chloride** cyclotrimerization recycling

IT **506-77-4P**

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);
RACT (Reactant or reagent)
(prepn. and cyclotrimerization of)

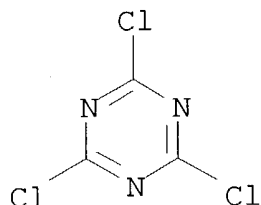
IT **108-77-0P**

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by cyclotrimerization of **cyanogen chloride**, recycling of gases from)

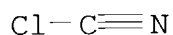
IT 74-90-8, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with chlorine, in prepn. of **cyanuric chloride**)

- IT 7782-50-5, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (recycling and reaction of, with hydrogen cyanide, in prepn. of
cyanuric chloride)
- L22 ANSWER 9 OF 25 HCA COPYRIGHT 2004 ACS on STN.
 83:97389 **Cyanuric chloride**. Alfenaar, Marinus;
 Jadoul, Desire J. N. (Stamicarbon B. V., Neth.). Ger. Offen. DE
 2449647 19750430, 10 pp. (German). CODEN: GWXXBX. APPLICATION: DE
 1974-2449647 19741018.
- GI For diagram(s), see printed CA Issue.
- AB An app. was described for the manuf. of **cyanuric
 chloride** (I) by electrolysis of Cl⁻ and HCN at 20-75°
 to give ClCN which was trimerized at 300-450°.
- IT **108-77-0P**
 RL: PREP (Preparation)
 (manuf. of, by trimerization of **cyanogen
 chloride**)
- RN 108-77-0 HCA
- CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



- IT **506-77-4**
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (trimerization of, **cyanuric chloride** from)
- RN 506-77-4 HCA
- CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



- IC C07D
- CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
- ST **cyanuric chloride**; trimerization
cyanogen chloride
- IT Trimerization
 (of **cyanogen chloride**, **cyanuric
 chloride** from)
- IT Electrolysis
 (of hydrogen cyanide and chloride(1-) ion, **cyanogen
 chloride** from)

IT 74-90-8
RL: RCT (Reactant); RACT (Reactant or reagent)
(electrolysis of chloride(1-) contg. mixts., **cyanogen chloride** from)

IT 108-77-0P
RL: PREP (Preparation)
(manuf. of, by trimerization of **cyanogen chloride**)

IT 506-77-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(trimerization of, **cyanuric chloride** from)

L22 ANSWER 10 OF 25 HCA COPYRIGHT 2004 ACS on STN

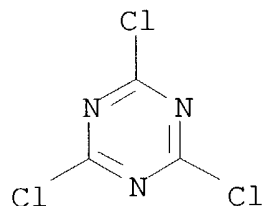
83:58887 **Cyanuric chloride**. Suryanarayana,
Yelagondahally S.; Reid, Luther J., Jr. (Ciba-Geigy Corp., USA).
U.S. US 3867382 19750218, 3 pp. (English). CODEN: USXXAM.
APPLICATION: US 1973-382245 19730724.

AB **Cyanuric chloride** was prepd. by trimerization of
ClCN in the presence of a coconut charcoal catalyst. The catalyst
activities of the non acid washed charcoal catalyst obtained from
Pittsburg Coke Co. at 70% ClCN conversion and 370° and
500° were comparable to those of the conventional catalysts..

IT 108-77-0P
RL: PREP (Preparation)
(by **cyanogen chloride** trimerization in
presence of coconut charcoal catalyst)

RN 108-77-0 HCA

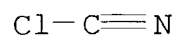
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(trimerization of, in presence of coconut charcoal catalyst)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IC C07D

NCL 260248000C

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
ST **cyanuric chloride**; charcoal catalyst coconut;
trimerization catalyst; **cyanogen chloride**
trimerization
IT Charcoal
RL: CAT (Catalyst use); USES (Uses)
(catalysts, from coconut, for trimerization of **cyanogen chloride**)
IT Trimerization catalysts
(charcoal, from coconut, for **cyanogen chloride**
)
IT **108-77-0P**
RL: PREP (Preparation)
(by **cyanogen chloride** trimerization in
presence of coconut charcoal catalyst)
IT **506-77-4**
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, in presence of coconut charcoal catalyst)

L22 ANSWER 11 OF 25 HCA COPYRIGHT 2004 ACS on STN
80:149317 Catalyst for the production of **cyanuric chloride**. Suryanarayana, Yelagondahally S.; Reid, Luther J., Jr. (Ciba-Geigy Corp.). U.S. US 3789021 19740129, 2 pp. Division of U.S. 3,707,544 (CA 78;72220e). (English). CODEN: USXXAM. APPLICATION: US 1972-298175 19721016.

AB The life of **activated C** catalysts used in the prodn. of **cyanuric chloride** from CNCl is doubled by intimately mixing the **activated C** low activity material such as quartz, **graphite**, or porcelain. Use of a mixt. of 1 part **activated C** and 0.5 parts quartz reduced the reaction temp. from 500° to 420°, eliminated hot spots, and extended catalyst life.

IT **7440-44-0**, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts, for trimerization of **cyanogen chloride**)

RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **7782-42-5**, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts, with **activated carbon** for
trimerization of **cyanogen chloride**)

RN 7782-42-5 HCA
CN Graphite (8CI, 9CI) (CA INDEX NAME)

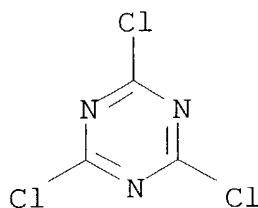
C

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, catalysts for)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)

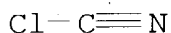


IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, catalysts for)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



NCL 252446000

CC 67-1 (Catalysis and Reaction Kinetics)

Section cross-reference(s): 28

ST carbon catalyst **cyanuric chloride**;**cyanogen chloride** trimerization catalyst; quartzcarbon trimerization catalyst; **graphite** carbon

trimerization catalyst

IT Trimerization catalysts

(carbon-diluent, for **cyanogen chloride** to
cyanuric chloride)

IT 7440-44-0, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)

(catalysts, for trimerization of **cyanogen
chloride**)IT 7782-42-5, uses and miscellaneous 14808-60-7, uses and
miscellaneous

RL: CAT (Catalyst use); USES (Uses)

(catalysts, with **activated carbon** for
trimerization of **cyanogen chloride**)

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of, catalysts for)

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, catalysts for)

L22 ANSWER 12 OF 25 HCA COPYRIGHT 2004 ACS on STN

80:3019 Reactions of chlorocyanogens with sulfur tetrafluoride and thionyl fluoride. Vorob'ev, M. D.; Filatov, A. S.; Englin, M. A. (USSR). Zhurnal Obshchei Khimii, 43(7), 1653 (Russian) 1973. CODEN: ZOKHA4. ISSN: 0044-460X.

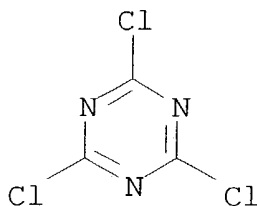
AB SF₄ and ClCN at 175° yield CF₂ClN:SF₂, S₂Cl₂, CF₃N:SF₂ and Cl. ClCN and SOF₂ at 300° gave **cyanuric chloride**, CF₂ClN:S:O being a minor by-product. NMR and ir spectra described.

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with sulfur tetrafluoride and thionyl fluoride)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

CC 23-4 (Aliphatic Compounds)

ST sulfur fluoride **cyanogen chloride** reaction;
thionyl fluoride **cyanogen chloride** reaction;
cyanogen chloride sulfur fluoride reaction; imine
fluoromethyl sulfur; sulfilimine fluoromethyl; aliph sulfilimine

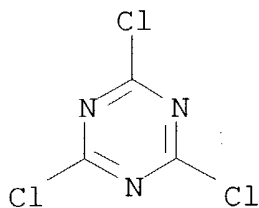
IT Imines

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(N-(fluoromethyl)sulfil, from **cyanogen chloride**
and sulfur tetrafluoride)

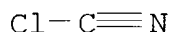
IT 108-77-0P 1512-14-7P 50745-93-2P 50745-94-3P

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of)
IT 7783-42-8 7783-60-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with **cyanogen chloride**)
IT 506-77-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with sulfur tetrafluoride and thionyl fluoride)
L22 ANSWER 13 OF 25 HCA COPYRIGHT 2004 ACS on STN
79:32110 **Cyanuric chloride**. Sada, Masao; Jinno,
Tatsuyoshi; Amano, Yoshifumi (Sumitomo Chemical Co., Ltd.). Jpn.
Kokai Tokyo Koho JP 48032893 19730502 Showa, 4 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 1971-67673 19710901.
AB Trimerization of chlorocyan (I), by passing it onto hot
active charcoal, was carried out in a stainless
steel reactor using I contg. <0.1% active H compds. and using <5% Cl
to I to give pure title compd. without any colorization.
IT 108-77-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)
RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(trimerization of, **cyanuric chloride** from)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



NCL 16E473
CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
ST chlorocyan trimerization **cyanuric chloride**
IT Trimerization
(of chlorocyan, **cyanuric chloride** from)
IT 108-77-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, **cyanuric chloride** from)

L22 ANSWER 14 OF 25 HCA COPYRIGHT 2004 ACS on STN

78:72220 Catalytic production of **cyanuric chloride**.

Suryanarayana, Yelagondahally S.; Reid, Luther J., Jr. (Ciba-Geigy Corp.). U.S. US 3707544 19721226, 2 pp. (English). CODEN: USXXAM.
APPLICATION: US 1971-142358 19710511.

AB The life of the C catalyst for trimerization of **cyanogen chloride** (I) to **cyanuric chloride** (II)

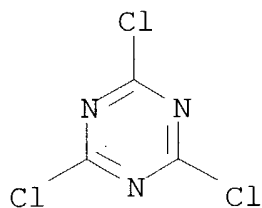
is approx. doubled by mixing with a solid diluent. Such mixed catalysts generate lower temps. and fewer hot spots. Thus, a 50:50 mixt. of CXAC catalyst (Union Carbide) and porcelain chips was used in the prodn. of II from I in a 20' tube reactor. A temp. of 470° was noted; with CXAC alone, 502° was measured.

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)

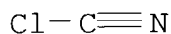


IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, over dild. **active carbon** catalysts)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IC C07D

NCL 260248000C

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
Section cross-reference(s): 67

ST **cyanuric chloride** manuf catalyst; temp lowering
cyanogen chloride trimerization

IT Trimerization catalysts
(dild. **active carbon**, for **cyanogen**)

- chloride)
- IT Catalysts and Catalysis
(dild. **active carbon**, for **cyanogen chloride** conversion to **cyanuric chloride**)
- IT 108-77-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)
- IT 506-77-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(trimerization of, over dild. **active carbon** catalysts)

L22 ANSWER 15 OF 25 HCA COPYRIGHT 2004 ACS on STN

78:72218 **Cyanuric chloride**. Riethmann, Jean
(Agripat S. A.). Patentschrift (Switz.) CH 529148 19721130, 2 pp.
(German). CODEN: SWXXAS. APPLICATION: CH 1970-529148 19700908.

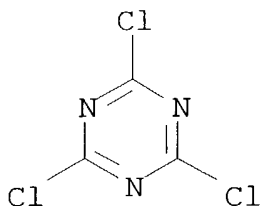
GI For diagram(s), see printed CA Issue.

AB An improved process for prepg. the title compd. (I) increases the life of the catalyst used. If the CNCl was dried over P2O5 before trimerization (H2O content 10-50 ppm) the **activated C** catalyst was active at least 6-9 months and conversion of CNCl to I remained at 83-95% (56 and 162 hr expt.).

IT 108-77-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(improved process for prepn.)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



- IT 506-77-4
RL: RCT (Reactant); RACT (Reactant or reagent)
(phosphorus pentoxide-dried, trimerization of)
- RN 506-77-4 HCA
- CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

IC C07D

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))

ST **cyanuric chloride** process improvement;
cyanogen chloride drying trimerization
IT **108-77-0**
RL: RCT (Reactant); RACT (Reactant or reagent)
(improved process for prepn.)
IT **1314-56-3**
RL: RCT (Reactant); RACT (Reactant or reagent)
(in **cyanogen chloride** trimerization)
IT **506-77-4**
RL: RCT (Reactant); RACT (Reactant or reagent)
(phosphorus pentoxide-dried, trimerization of)

L22 ANSWER 16 OF 25 HCA COPYRIGHT 2004 ACS on STN

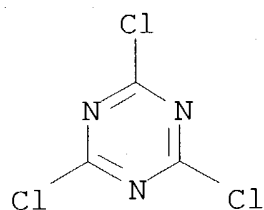
78:4287 **Cyanuric chloride**. Kobayashi, Kihachiro;
Yoshida, Hiroshi; Koyama, Yuichiro; Takakura, Yutaka (Japan Soda
Co., Ltd.). Jpn. Kokai Tokkyo Koho JP 47025187 19721019 Showa, 6
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1971-15823
19710322.

AB CNCl was subjected to polymn. in the presence of Cl and
activated C catalyst so that **cyanuric
chloride** was continuously.

IT **108-77-0P**
RL: PREP (Preparation)
(from polymerization of **cyanogen chloride**)

RN 108-77-0 HCA

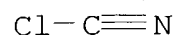
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT **506-77-4**
RL: RCT (Reactant); RACT (Reactant or reagent)
(polymerization of, **cyanuric chloride** prepn.
from)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



NCL 16E473

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
Section cross-reference(s): 35

ST polymn **cyanogen chloride; cyanuric chloride**

IT 108-77-0P

RL: PREP (Preparation)

(from polymerization of **cyanogen chloride**)

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(polymerization of, **cyanuric chloride** prepn. from)

L22 ANSWER 17 OF 25 HCA COPYRIGHT 2004 ACS on STN

77:164642 Trimerization of **cyanogen chloride** to

cyanuric chloride. Wolf, Friedrich; Renger, Peter

(Sekt. Chem., Martin-Luther-Univ. Halle-Wittenberg, Halle/Saale,

Ger. Dem. Rep.). Zeitschrift fuer Chemie, 12(8), 293-4 (German)

1972. CODEN: ZECEAL. ISSN: 0044-2402.

AB Trimerization of ClCN on mol. sieves of the type 13X [Na⁺ form (6.5 C) and H⁺ form, resp.] at 320° gave **cyanuric**

chloride at 32, 53.2, and 81.7 conversion, resp. The

selective trimerization of ClCN on mol. sieves was favored by the

action of geometric factors. The trimerization was of 1st order and

the activation energy was 15.2 kcal/mole.

IT 7440-44-0, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)

(catalysts, mol. sieves, contg. for trimerization of **cyanogen chloride**)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT 108-77-0P

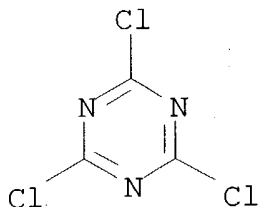
RL: PREP (Preparation)

(manuf. of, by trimerization of **cyanogen**

chloride, catalysts for)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, catalysts for)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))

ST **cyanogen chloride** trimerization catalyst;
cyanuric chloride; mol sieve trimerization
catalyst

IT Molecular sieves
(catalysts, for trimerization of **cyanogen
chloride**)

IT Trimerization catalysts
(mol. sieves, for **cyanogen chloride**)

IT **7440-44-0**, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts, mol. sieves, contg. for trimerization of
cyanogen chloride)

IT **108-77-0P**
RL: PREP (Preparation)
(manuf. of, by trimerization of **cyanogen
chloride**, catalysts for)

IT **506-77-4**
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of, catalysts for)

L22 ANSWER 18 OF 25 HCA COPYRIGHT 2004 ACS on STN
77:75220 Electronic instrumentation system for catalytic
cyanogen chloride trimerization. Bradley, Claude
G. (Geigy Chemical Corp). U.S. US 3654447 19720404, 9 pp.
(English). CODEN: USXXAM. APPLICATION: US 1970-31267 19700423.

AB **Cyanogen chloride** is trimerized to form
cyanuric chloride in an exothermic reaction in
tubes packed with **activated charcoal**. Spaced
temp.-responsive transducers in the reaction chamber supply
analog-output temp. information which is used in a digital computer
to det. the continuous temp.-reaction distance function.

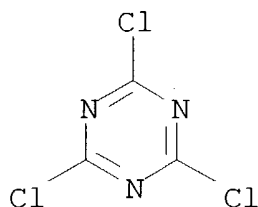
IT **506-77-4**
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(catalytic trimerization by digital computer)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IT 108-77-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)
RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC G06G
NCL 235151120
CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
Section cross-reference(s): 47
ST control instrument cyanurate; trimer cyanogen instrument cyanurate;
catalysis instrument cyanurate; **chloride cyanogen**
cyanurate
IT Trimerization catalysts
(carbon, in **cyanogen chloride** to
cyanuric chloride by electronic instrumentation
systems)
IT Computer application
(in catalytic trimerization of **cyanogen**
chloride)
IT 506-77-4
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(catalytic trimerization by digital computer)
IT 108-77-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)
L22 ANSWER 19 OF 25 HCA COPYRIGHT 2004 ACS on STN
77:64173 Production of **cyanogen chloride** together
with **cyanuric chloride** and tetrameric
cyanogen chloride. Enders, Edgar (Farbenfabriken
Bayer A.-G.). U.S. US 3666427 19720530, 2 pp. (English). CODEN:
USXXAM. APPLICATION: US 1969-803988 19690303.
AB ClCN is prepd. by reacting liq. Cl and liq. HCN at -20 to 30°
and 4-20 atm, preferably in the presence of an inorg. halogen compd.
as catalyst. By increasing the reactor pressure, e.g. to 50 atm, by
introducing an inert gas, e.g. N, the ClCN is slowly trimerized to
cyanuric chloride. Formed as a secondary product
is 2,4-dichloro-6-(dichloromethyleneamino)-1,3,5-triazine. If only

ClCN is wanted the process is carried out in a continuous cycle in which the reaction products are contacted with **active C** catalyst at 300-400°.

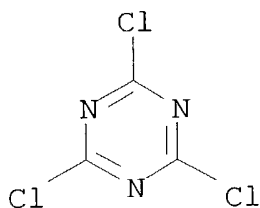
IT **108-77-0P**

RL: PREP (Preparation)

(from **cyanogen chloride** manuf., from hydrocyanic acid by liq.-phase chlorination)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT **506-77-4P**

RL: PREP (Preparation)

(from hydrocyanic acid, by liq.-phase chlorination)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C01B; C01C; C07C

NCL 023359000

CC 49-8 (Industrial Inorganic Chemicals)

ST **cyanogen chloride; cyanuric chloride**

IT **108-77-0P** 877-83-8P

RL: PREP (Preparation)

(from **cyanogen chloride** manuf., from hydrocyanic acid by liq.-phase chlorination)

IT **506-77-4P**

RL: PREP (Preparation)

(from hydrocyanic acid, by liq.-phase chlorination)

L22 ANSWER 20 OF 25 HCA COPYRIGHT 2004 ACS on STN

75:97936 Kinetics of the vapor-phase trimerization of **cyanogen chloride**. Malinin, N. K.; Matros, Yu. Sh.; Vytnov, G. F.; Slin'ko, M. G.; Timoshenko, V. I.; Gorskii, V. G. (USSR). Khimicheskaya Promyshlennost (Moscow, Russian Federation), 47(7), 488-92 (Russian) 1971. CODEN: KPRMAW. ISSN: 0023-110X.

AB Kinetic models of trimerization of ClCN on **activated carbon** (I) in a flowtype app. were made for const. and

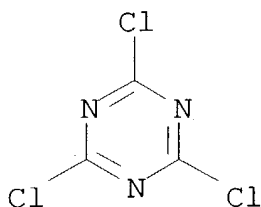
decreasing I activity. The rate detg. step is first order in ClCN. I poisoning is not due to (ClCN)₃ but due to a form of ClCN incapable of desorption.

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, kinetics of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



CC 22 (Physical Organic Chemistry)

ST **cyanogen chloride** trimerization kinetics

IT Activation energy of trimerization

Kinetics of trimerization

(of **cyanogen chloride**)

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, kinetics of)

L22 ANSWER 21 OF 25 HCA COPYRIGHT 2004 ACS on STN

75:38576 **Cyanuric chloride** from dry chlorocyanogen.

Riethmann, Jean (Agripat S. A.). Ger. Offen. DE 2045786 19710506, 9 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1970-2045786 19700916.

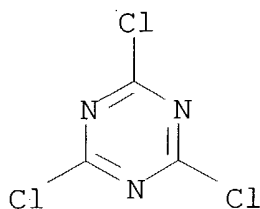
AB **Cyanuric chloride** (I), useful for the prepn. of chemotherapeutics, dyes, resins, etc., was prepd. by passing ClCN (II), dried over P₂O₅, at 20 g/hr and Cl at 2.3 g/hr over **activated C** at 360° and 15 sec contact time to give 82.8% conversion to I after 36 hr, which was const. for further 56 hr. The **activated C** had 6-9 months lifetime as compared with 30-60 days when using moist II.

IT 108-77-0P

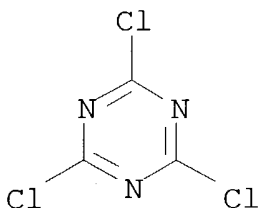
RL: PREP (Preparation)
(from **cyanogen chloride**, drying with phosphorus oxide for)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



- IC C07D
CC 49 (Industrial Inorganic Chemicals)
ST **cyanuric chloride** manuf chlorocyanogen
IT Drying
(of **cyanogen chloride**, with phosphorus oxide
for **cyanuric chloride** manuf.)
IT 1314-56-3
RL: USES (Uses)
(drying with, of **cyanogen chloride** for
cyanuric chloride manuf.)
IT **108-77-0P**
RL: PREP (Preparation)
(from **cyanogen chloride**, drying with
phosphorus oxide for)
- L22 ANSWER 22 OF 25 HCA COPYRIGHT 2004 ACS on STN
74:125735 **Cyanuric chloride**. Ferguson, John F.;
McCracken, Philip G. (Agripat S.A.). Ger. Offen. DE 2045823
19710401, 8 pp. (German). CODEN: GWXXBX. APPLICATION: DE
1970-2045823 19700916.
- AB ClCN(g) is dried by CaCl₂ and successively by CaSO₄ at 5-10 min
residence time and trimerized in the presence of catalytically
active charcoal. The CaSO₄ treatment reduces the
H₂O content to ≤50 ppm and increases the lifetime of the
catalyst from 1-2 to ≥6-9 months.
- IT **108-77-0P**
RL: IMF (Industrial manufacture); PREP (Preparation)
(manuf. of)
- RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC C07D
 CC 28 (Heterocyclic Compounds (More Than One Hetero Atom))
 ST **cyanuric chloride** manuf; **cyanogen chloride** trimerization
 IT **108-77-0P**
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (manuf. of)

L22 ANSWER 23 OF 25 HCA COPYRIGHT 2004 ACS on STN
 72:100763 Preparing a solution of **cyanuric chloride**
 from **cyanuric chloride** gas. Evers, William J.
 (Agripat S. A.). Fr. FR 1555982 19700219, 10 pp. (French). CODEN:
 FRXXAK. APPLICATION: FR 1968-140195 19680216.

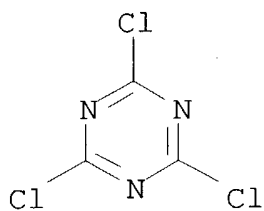
GI For diagram(s), see printed CA Issue.

AB CNCl together with gaseous impurities such as CO₂, Cl, (CN)₂, N,
 COCl₂, and HCl is fed to a trimerizer. The product which is
 substantially completely converted to (CHCl)₃ (I) is passed to a
 condenser where some I condenses, the liq. I contg. CNCl, CO₂, and
 COCl₂ passed to an adsorption tower where it is dissolved in CCl₄,
 the soln. led to a sepg. tower which is gently heated evap. all but
 the I in CCl₄, and the residue led to a transfer tower where it is
 contacted with toluene to form a soln. of I in toluene.

IT **108-77-0P**
 RL: PREP (Preparation)
 (manuf. of, from **cyanogen chloride**)

RN 108-77-0 HCA

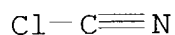
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT **506-77-4**
 RL: RCT (Reactant); **RACT (Reactant or reagent)**
 (trimerization of impure)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IC C01C
 CC 28 (Heterocyclic Compounds (More Than One Hetero Atom))
 ST **cyanuric chloride; chloride**

IT **cyanuric**; trichloro triazines; triazines trichloro
108-77-0P

RL: PREP (Preparation)
(manuf. of, from **cyanogen chloride**)

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization of impure)

L22 ANSWER 24 OF 25 HCA COPYRIGHT 2004 ACS on STN

71:90717 N-chlorochloroformimidoyl chloride[N-chloroisocyanide
dichloride] from **cyanogen chloride** and chlorine.

Hagemann, H.; Arlt, D.; Ugi, I. (Wiss. Hauptlab., Farbenfabriken
Bayer A.-G., Leverkusen, Fed. Rep. Ger.). Angewandte Chemie,
International Edition in English, 8(8), 606-7 (English) 1969.
CODEN: ACIEAY. ISSN: 0570-0833.

AB Cl and ClCN in 3:2 molar ratio heated in the presence of 1%
active C in a bomb tube or a Ni autoclave at
60° 18 hrs. gave 77% conversion, with formation of 95%
Cl₂C:-NCl (I) and <5% **cyanuric chloride**. I is a
strong chlorinating agent and adds to olefins. I was characterized
by ir and mass spectra.

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(addn. reaction of, with chlorine)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

CC 23 (Aliphatic Compounds)

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(addn. reaction of, with chlorine)

IT 7782-50-5, reactions

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(addn. reaction of, with **cyanogen chloride**)

L22 ANSWER 25 OF 25 HCA COPYRIGHT 2004 ACS on STN

66:95009 Preparation of **cyanuric chloride** in a
single step. Nadasy, Miklos; Pfeifer, Gyula; Erbits, Frigyes;
Raskai, Bela Nehezvegyipari Kutato Intezet Kozlemenyei, 3(1-2),
9-17 (Hungarian) 1966. CODEN: NEKUAB. ISSN: 0505-3919.

AB On an **activated C** catalyst at >200°, HCN
and Cl are converted to ClCN with subsequent trimerization resulting
in **cyanuric chloride**. Heat of reaction of the
chlorination and of trimerization, role of temp. and pressure, and
results of lab. and pilot-plant expts. are discussed. Effect of

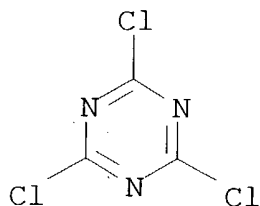
different catalysts on production is compared. 17 references.

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, heat of reaction of catalytic)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)

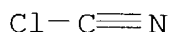


IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization (catalytic) of)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



CC 28 (Heterocyclic Compounds (More Than One Hetero Atom))

IT Trimerization catalysts
(for **cyanogen chloride**)

IT Heat of trimerization
(of **cyanogen chloride**)

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, heat of reaction of catalytic)

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(trimerization (catalytic) of)

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L24 ANSWER 1 OF 19 HCA COPYRIGHT 2004 ACS on STN

127:81821 First principles investigations of polymerization reactions of CK and AC. Rice, Betsy M.; Pai, Sharmila V.; Chabalowski, Cary F. (U. S. Army Research Laboratory, Aberdeen Proving Ground, MD, 21005-5066, USA). Proceedings of the ERDEC Scientific Conference on Chemical and Biological Defense Research, Aberdeen Proving Ground, Md., Nov. 14-17, 1995, Meeting Date 1995, 811-817. Editor(s): Berg, Dorothy A. National Technical Information Service: Springfield, Va. (English) 1996. CODEN: 64OYA8.

AB Quantum mech. calcns. [ab initio and D. Functional Theory (DFT)] were performed to investigate reaction mechanisms for formation and decompn. of the six-membered rings $C_3N_3X_3$, where X denotes Cl or H. $C_3N_3Cl_3$ (**cyanuric chloride**) and $C_3N_3H_3$ (sym-triazine) are the polymn. products of agents CK (ClCN) and AC (HCN) which were std. and substitute fill, resp., of chem. munitions during World War II. The process of the polymn. to the trimer species of CK and AC has long been rumored to be highly exothermic and thought to be the cause of explosions of cylinders contg. these agents. The calcns. presented here det. energy release upon reaction, activation barriers and details of the reaction mechanisms for the polymn. of these agents. The calcns. investigate concerted triple assocn. and step-wise addn. reactions leading to the trimers, and provide information on the low-energy pathway to polymn. Ab initio MP2 and non-local DFT geometry optimizations for crit. points on the potential energy surfaces were calcd. with the 6-31G** 6-311++G** and cc-pVTZ basis sets. The MP2 calcns. were followed by QCISD(T) energy refinements for the AC system. Good agreement with expt. is found for the predicted geometries and frequencies of sym-triazine, HCN, ClCN and **cyanuric chloride**. All calcns. indicate that CK and AC have similar features on the potential energy surfaces for the polymn. reactions. All calcns. show that the lowest-energy formation mechanism for trimerization is the concerted triple assocn. In both chem. systems, a weakly-bound $(XCN)_3$ cluster is a pre-reaction intermediate to the polymn. This reduces entropic hindrance to the unusual concerted triple assocn. of the CK and AC mols. Both systems have a large energy release upon trimerization and similar barriers to activation of the reactions. The energy available to the surrounding system upon crossing the reaction barrier is sufficient to initiate chain reactions.

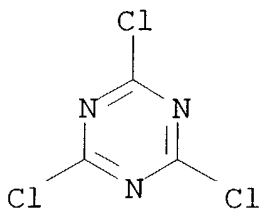
IT 108-77-0, **Cyanuric chloride**

RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); FORM (Formation, nonpreparative); PROC (Process)

(quantum mech. calcns. of formation and decompn. of CK and AC trimers in explosivity evaluation)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4, **Cyanogen chloride** ((CN)Cl)
RL: PEP (Physical, engineering or chemical process); PRP
(Properties); RCT (Reactant); PROC (Process); **RACT (Reactant or reagent)**
(quantum mech. calcns. of formation and decompn. of CK and AC
trimers in explosivity evaluation)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

CC 35-3 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 4, 50, 60, 65
ST polymn reaction CK AC munitions; ab initio calcn trimerization CK
AC; mechanism trimerization CK AC; triazine formation decompn
quantum calcn; **cyanuric chloride** formation
decompn quantum calcn; explosivity CK AC munitions trimerization
decompn; potential energy surface trimerization CK AC
IT 108-77-0, **Cyanuric chloride** 290-87-9,
1,3,5-Triazine
RL: FMU (Formation, unclassified); PEP (Physical, engineering or
chemical process); PRP (Properties); FORM (Formation,
nonpreparative); PROC (Process)
(quantum mech. calcns. of formation and decompn. of CK and AC
trimers in explosivity evaluation)
IT 74-90-8, Hydrogen cyanide, reactions 506-77-4,
Cyanogen chloride ((CN)Cl)
RL: PEP (Physical, engineering or chemical process); PRP
(Properties); RCT (Reactant); PROC (Process); **RACT (Reactant or reagent)**
(quantum mech. calcns. of formation and decompn. of CK and AC
trimers in explosivity evaluation)
L24 ANSWER 2 OF 19 HCA COPYRIGHT 2004 ACS on STN
126:230043 Ab Initio and DFT Potential Energy Surfaces for
Cyanuric Chloride Reactions. Pai, Sharmila V.;
Chabalowski, Cary F.; Rice, Betsy M. (U.S. Army Research Laboratory,
Aberdeen Proving Ground, MD, 21005-5066, USA). Journal of Physical
Chemistry A, 101(18), 3400-3407 (English) 1997. CODEN: JPCAFH.
ISSN: 1089-5639. Publisher: American Chemical Society.
AB Ab initio and nonlocal d. functional theory (DFT) calcns. were
performed to det. reaction mechanisms for formation of the
six-membered ring C3N3Cl3 (**cyanuric chloride**)
from the monomer **cyanogen chloride** (ClCN). MP2
geometry optimizations followed by QCISD(T) energy refinements and
corrections for zero-point energies for crit. points on the
potential energy surface were calcd. using the 6-31G* and 6-311+G*

basis sets. DFT (B3LYP) geometry optimizations and zero-point corrections for crit. points on the potential energy surface were calcd. with the 6-31G*, 6-311+G*, and cc-pVTZ basis sets. Good agreement is found for MP2 and DFT geometries and frequencies of **cyanuric chloride** and ClCN when compared with exptl. values. Two formation mechanisms of **cyanuric chloride** were investigated, the concerted triple assocn. ($3\text{ClCN} \rightarrow \text{cyanuric chloride}$) and the stepwise assocn. ($3\text{ClCN} \rightarrow \text{Cl}_2\text{C}_2\text{N}_2 + \text{ClCN} \rightarrow \text{cyanuric chloride}$). All calcns. show that the lower energy path to formation of **cyanuric chloride** is the concerted triple-assocn. MP2 and DFT intrinsic reaction coordinate calcns. starting from the transition state for concerted triple assocn. reaction proceeding toward the isolated monomer resulted in the location of a local min., stable by as much as -8.0 kcal/mol, that corresponds to a weakly-bound cyclic (ClCN)₃ cluster. The existence of this cluster on the reaction path for the concerted triple assocn. could lower the entropic hindrance to this unusual assocn. reaction mechanism. The DFT/cc-pVTZ barrier to concerted triple assocn. relative to isolated ClCN is 42.9 kcal/mol. The QCISD(T)//MP2/6-311+G* barrier to concerted triple assocn. is 41.0 kcal/mol. The DFT/cc-pVTZ barrier to formation of the dimer (stepwise assocn. reaction) is 63.4 kcal/mol while the QCISD(T)//MP2/6-311+G* barrier is 76.7 kcal/mol. The barrier to formation of **cyanuric chloride** relative to the (ClCN)₃ min. requires .apprx.46-49 kcal/mol, indicating that the concerted triple-assocn. reaction via formation of the (ClCN)₃ prereaction intermediate is the lower energy path to formation of **cyanuric chloride**. The temp.-cor. (T = 298 K) heats of reaction for formation of **cyanuric chloride** from ClCN are -63.4 and -61.2 kcal/mol for the B3LYP/cc-pVTZ and the QCISD(T)//MP2/6-311+G* predictions, resp.

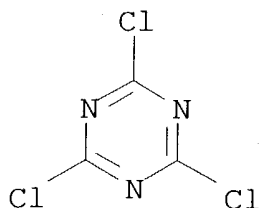
IT 108-77-0, **Cyanuric chloride**

RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); FORM (Formation, nonpreparative); PROC (Process)

(ab initio and DFT potential energy surfaces for **cyanuric chloride** reactions)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4, **Cyanogen chloride**
RL: PEP (Physical, engineering or chemical process); PRP
(Properties); RCT (Reactant); PROC (Process); **RACT (Reactant or
reagent)**
(ab initio and DFT potential energy surfaces for **cyanuric
chloride** reactions)
RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

CC 67-3 (Catalysis, Reaction Kinetics, and Inorganic Reaction
Mechanisms)
Section cross-reference(s): 50, 65, 69
ST density functional theory reaction **cyanogen
chloride**; ab initio reaction **cyanogen
chloride**; **cyanuric chloride** formation
potential energy surface; mechanism **cyanuric
chloride** formation
IT Density functional theory
Molecular structure
Molecular vibration
Potential energy surface
Reaction enthalpy
Reaction kinetics
Reaction mechanism
Transition state structure
(ab initio and DFT potential energy surfaces for **cyanuric
chloride** reactions)
IT Ab initio methods
(and DFT potential energy surfaces for **cyanuric
chloride** reactions)
IT 108-77-0, **Cyanuric chloride**
RL: FMU (Formation, unclassified); PEP (Physical, engineering or
chemical process); PRP (Properties); FORM (Formation,
nonpreparative); PROC (Process)
(ab initio and DFT potential energy surfaces for **cyanuric
chloride** reactions)
IT 506-77-4, **Cyanogen chloride**
RL: PEP (Physical, engineering or chemical process); PRP
(Properties); RCT (Reactant); PROC (Process); **RACT (Reactant or
reagent)**
(ab initio and DFT potential energy surfaces for **cyanuric
chloride** reactions)

125:339139 Non-immunogenic, biocompatible macromolecular membrane compositions, and methods for making and using same. Mares-Guia, Marcos (Biommm, Incorporated, USA). PCT Int. Appl. WO 9632098 A1 19961017, 45 pp. DESIGNATED STATES: W: BR; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1996-US4534 19960403. PRIORITY: US 1995-417652 19950405.

AB Disclosed and claimed are non-immunogenic biocompatible macromol. sheet compn. pouches. The compn. is formed from a cellulosic membrane, a binding moiety having a plurality of functional groups, and a glycosaminoglycan (GAG). The binding moiety has the formula of R1-X-R2 wherein R1 and R2 are the same or different. The binding moiety, through functional groups binds the cellulosic membrane with the glycosaminoglycan. R1 is covalently bound to a carbon or an oxygen of the cellulosic membrane. R2 is covalently bound to a carbon, an oxygen, or a nitrogen of the glycosaminoglycan. The binding moiety can be bisoxirane, butanediol-diglycidyl ether (BDE), or divinyl sulfone. The cellulosic membrane can be a cellulosic membrane, partially acetylated cellulose and a copolymer of hydroxyethyl methacrylate with Me methacrylate, abbreviated as HEMA-MMA. The non-immunogenic biocompatible macromol. sheet compn. can be formed into a pouch to encapsulate cells, tissues, pharmaceuticals, or biol. metabolic products. In addn., the non-immunogenic biocompatible macromol. sheet compn. can also be used as a skin graft or a skin substitute. Further, these non-immunogenic biocompatible macromol. sheet compn. can also be used as a surface to culture cells in vitro.

IT 108-77-0, Trichloro-s-triazine 506-77-4,

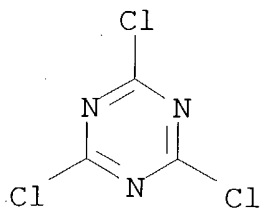
Cyanogen chloride

RL: RCT (Reactant); **RACT (Reactant or reagent)**

(nonimmunogenic, biocompatible macromol. membrane compns.)

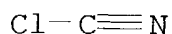
RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



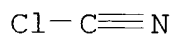
IC ICM A61K009-70
ICS A61K031-715; C07H001-00
CC 63-7 (Pharmaceuticals)
IT 108-77-0, Trichloro-s-triazine 506-68-3, Cyanogen bromide
506-77-4, **Cyanogen chloride** 506-78-5,
Cyanogen iodide 697-83-6, 2,4,6-Trifluoro-5-chloropyrimidine
1495-50-7, Cyanogen fluoride
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(nonimmunogenic, biocompatible macromol. membrane compns.)

L24 ANSWER 4 OF 19 HCA COPYRIGHT 2004 ACS on STN
115:222328 Photometric method and device for determination of chlorione
gas in **cyanogen chloride** gas. Haubrich,
Gerhard; Nischk, Wolfgang; Lamberty, Reinold (Degussa A.-G.,
Germany). Ger. DE 4009252 C1 19910620, 3 pp. (German). CODEN:
GWXXAW. APPLICATION: DE 1990-4009252 19900322.

AB This method, for detn. of Cl₂ gas in **cyanogen
chloride** used in the synthesis of **cyanuric
chloride**, comprises condensation of a part of the stream of
the **cyanogen chloride/cyanuric
chloride** gas mixt. and continuous photometry for detn. of
the Cl₂ in the **cyanogen chloride** condensate.

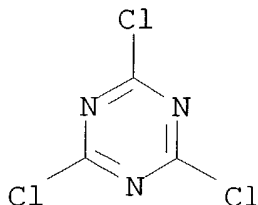
IT 506-77-4, **Cyanogen chloride**
RL: ANST (Analytical study)
(chlorine detn. in gaseous, photometric method and device for)

RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



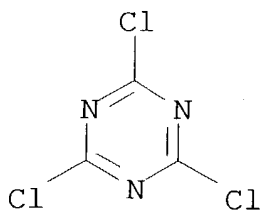
IT 108-77-0P, **Cyanuric chloride**
RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(synthesis of, chlorine detn. in gaseous **cyanogen
chloride** for, photometric method and device for)

RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC ICM G01N031-02
ICS G01N033-00; G01N021-31; C07D251-28

- ICA C01C003-00; C01B007-01
CC 79-6 (Inorganic Analytical Chemistry)
ST chlorine gas detn **cyanogen chloride** photometry;
cyanogen chloride analysis chloride gas photometry
IT **506-77-4, Cyanogen chloride**
RL: ANST (Analytical study)
(chlorine detn. in gaseous, photometric method and device for)
IT 7782-50-5, Chlorine, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, in gaseous **cyanogen chloride**,
photometric method and device for)
IT **108-77-0P, Cyanuric chloride**
RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(synthesis of, chlorine detn. in gaseous **cyanogen**
chloride for, photometric method and device for)
- L24 ANSWER 5 OF 19 HCA COPYRIGHT 2004 ACS on STN
102:137848 Covalently attached complex of α -1-proteinase inhibitor
with a water-soluble polymer. Mitra, Gautam (Miles Laboratories,
Inc. , USA). U.S. US 4496689 A 19850129, 14 pp. (English).
CODEN: USXXAM. APPLICATION: US 1983-565810 19831227.
- AB A covalent complex of human glycan α 1-proteinase inhibitor
with a polysaccharide or polyol is useful for treatment of pulmonary
emphysema and respiratory distress syndrome. For example, 1 g
dextran (mol. wt. 17,700) in 100 mL water at pH 10.7 and 20°
was activated by coupling with 0.4 g CNBr for 40 min and the soln.
was dialyzed. Purified α 1-proteinase inhibitor (209 mg) from
Cohn fraction IV-1 was added, the pH was adjusted to 9.6, and
coupling was carried at 5° for 18 h. The soln. was dialyzed
and 0.7 g glycine was added to a final pH of 7.10. Catalase
[9001-05-2] maybe added to the complex as an antioxidant.
- IT **108-77-ODP**, reaction products with polymers or
polysaccharides and α 1-proteinase inhibitor **506-77-4DP**
, reaction products with polymers or polysaccharides and
 α 1-proteinase inhibitor
RL: PREP (Preparation)
(prepn. of, for emphysema treatment)
- RN 108-77-0 HCA
CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA
CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC ICM C07G007-00

NCL 525054100

CC 63-6 (Pharmaceuticals)

Section cross-reference(s): 7

IT 106-50-3DP, reaction products with cyanogen bromide and polymers or polysaccharides and α 1-proteinase inhibitor **108-77-ODP**, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor 506-68-3DP, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor **506-77-4DP**, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor 506-78-5DP, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor 933-20-0DP, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor 9002-89-5DP, reaction products with α 1-proteinase inhibitor 9003-39-8DP, reaction products with α 1-proteinase inhibitor 9004-32-4DP, reaction products with α 1-proteinase inhibitor 9004-34-6DP, reaction products with α 1-proteinase inhibitor 9004-53-9DP, reaction products with α 1-proteinase inhibitor 9004-54-0DP, reaction products with α 1-proteinase inhibitor 9004-67-5DP, reaction products with α 1-proteinase inhibitor 9004-74-4DP, reaction products with α 1-proteinase inhibitor 9005-25-8DP, reaction products with α 1-proteinase inhibitor 9005-49-6DP, reaction products with α 1-proteinase inhibitor 9041-92-3DP, reaction products with polymers or polysaccharides 9042-14-2DP, reaction products with α 1-proteinase inhibitor 9044-05-7DP, reaction products with α 1-proteinase inhibitor 9078-43-7DP, reaction products with α 1-proteinase inhibitor 25322-68-3DP, reaction products with α 1-proteinase inhibitor 26471-62-5DP, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor 92079-72-6DP, reaction products with polymers or polysaccharides and α 1-proteinase inhibitor
RL: PREP (Preparation)
(prepn. of, for emphysema treatment)

L24 ANSWER 6 OF 19 HCA COPYRIGHT 2004 ACS on STN

87:6876 Polytriazines. Sundermann, Rudolf; Rottloff, Guenther; Grigat, Ernst (Bayer A.-G., Fed. Rep. Ger.). Ger. Offen. DE 2546355 19770421, 25 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1975-2546355 19751016.

AB Diamines, aminophenols, or aminoalkanols are condensed with $\geq 1/3$ g/mol **cyanuric chloride** (I) [

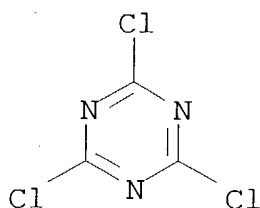
108-77-0]/g-mole total amino and OH groups, treated with a different aminophenol in amts. of $\geq 1/6$ g-mole/g-mole Cl in the condensate, and then treated with a cyanogen halide, giving products which can be cyclotrimerized to crosslinked polytriazines. Thus, 0.1 mole hexamethylenediamine [124-09-4] and 0.2 mole I in dichloroethane were treated with 0.2 mole Et₃N at 20°, freed of pptd. hydrochloride, mixed with 0.4 mole p-aminophenol [123-30-8], treated with 0.4 mol Et₃N at 30-40°, refluxed 6 h, and freed of ppts. The resulting soln. was treated with 0.44 mol ClCN at 0° and 0.407 mol Et₃N, giving 69 g of a cyanate resin. When 20 g of the cyanate resin was heated 5 h at 230°, a honey-colored, very hard polytriazine was obtained.

IT 108-77-0D, reaction products with aminophenols and diamines or aminoalkanols, cyanate derivs. 506-77-4D, reaction products with aminophenol-cyanuric chloride-diamine adducts

RL: RCT (Reactant); RACT (Reactant or reagent)
(crosslinking and trimerization of)

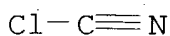
RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)



IC C08G073-06

CC 36-3 (Plastics Manufacture and Processing)

ST cyanated polytriazine crosslinking trimerization; cyanuric chloride diamine aminophenol adduct

IT Trimerization

(crosslinking and, of cyanated aminophenol-cyanuric chloride-diamine adducts)

IT Polymerization

(of cyanated aminophenol-cyanuric chloride-diamine adducts, by cyclotrimerization)

IT Crosslinking

(trimerization and, of cyanated aminophenol-cyanuric chloride-diamine adducts)

IT 93-36-7D, reaction products with aminophenol and **cyanuric chloride**, cyanated 108-77-0D, reaction products with aminophenols and diamines or aminoalkanols, cyanate derivs. 110-70-3D, reaction products with **cyanuric chloride** and aminophenol, cyanated 123-30-8D, reaction products with **cyanuric chloride** and alkylenediamines, cyanated 124-09-4D, reaction products with **cyanuric chloride** and aminophenol, cyanated 150-75-4D, reaction products with **cyanuric chloride** and dimethylethylenediamine, cyanated 156-87-6D, reaction products with aminohydroxydiphenylpropane and **cyanuric chloride**, cyanated 506-77-4D, reaction products with aminophenol-**cyanuric chloride**-diamine adducts 591-27-5D, reaction products with aminonaphthol and **cyanuric chloride**, cyanated 837-11-6D, reaction products with aminopropanol and **cyanuric chloride**, cyanated
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(crosslinking and trimerization of)

L24 ANSWER 7 OF 19 HCA COPYRIGHT 2004 ACS on STN

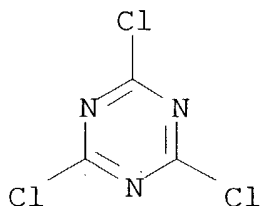
86:190869 Polytriazines. Sundermann, Rudolf; Rottloff, Guenther; Grigat, Ernst (Bayer A.-G., Fed. Rep. Ger.). Ger. Offen. DE 2546369 19770421, 17 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1975-2546369 19751016.

AB The title polymers are manufd. by condensing di- or polyamines with less than 1/3 mol **cyanuric chloride** (I) [108-77-0]/mole amino group, treating with ClCN to form cyanamides, and polymn. at 0-350°, optionally in the presence of trimerization catalysts. Thus, 1 mole I was added slowly to a soln. of 3 mol N,N'-dimethylethylenediamine [110-70-3] and 3 mol Et3N in 1 L acetone and heated 1 h at 50°, giving a condensation product which was isolated, dissolved in dichloroethane, treated with 3.3 mol ClCN and 3.05 moles Et3N as 0°, giving 385 g of a cyanamide group-contg. triazine resin. Heating 10 g of this resin 5 h at 220° in the presence of 0.2% wt. Zn octanoate gave a bright yellow, very hard polytriazine.

IT 108-77-0D, reaction products with diamines, cyanamide derivs. 506-77-4D, reaction products with **cyanuric chloride**-diamine adducts
RL: RCT (Reactant); **RACT (Reactant or reagent)**
(crosslinking of, by trimerization)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA
 CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N.

IC C08G073-06
 CC 36-3 (Plastics Manufacture and Processing)
 ST polytriazine manuf; **cyanuric chloride** diamine
 polymn; cyanamide group contg polytriazine; trimerization
 crosslinking cyanamidotriazine
 IT Polymerization
 (of **cyanuric chloride** with polyamines)
 IT 95-80-7D, reaction products with **cyanuric chloride**
 , cyanamide derivs. 101-77-9D, reaction products with
cyanuric chloride, cyanamide derivs.
 108-77-0D, reaction products with diamines, cyanamide
 derivs. 110-70-3D, reaction products with **cyanuric**
chloride, cyanamide derivs. 110-85-0D, reaction products
 with **cyanuric chloride**, cyanamide derivs.
 506-77-4D, reaction products with **cyanuric**
chloride-diamine adducts 62952-05-0D, reaction products
 with **cyanuric chloride**, cyanamide derivs.
 RL: RCT (Reactant); **RACT (Reactant or reagent)**
 (crosslinking of, by trimerization)

L24 ANSWER 8 OF 19 HCA COPYRIGHT 2004 ACS on STN
 86:190868 Polytriazines. Sundermann, Rudolf; Rottloff, Guenther;
 Grigat, Ernst (Bayer A.-G., Fed. Rep. Ger.). Ger. Offen. DE 2546270
 19770421, 15 pp. (German). CODEN: GWXXBX. APPLICATION: DE
 1975-2546270 19751016.
 AB Aminoalkyl- or amino-substituted phenolic compds. were treated with
 <1/3 mol **cyanuric chloride** (I) [108-77-0
]/g-mol total amino and OH groups, treated with cyanogen halides in
 the presence of base at <65° to give cyanamide and cyanic
 ester groups, and polytrimerized to give a crosslinked polytriazine
 resin. Thus, 0.3 mol p-(methylamino)phenol [150-75-4] and 0.1 mol I
 in 200 mL alc. were treated with 120 mL 10% NaOH at 20°,
 stirred 1 h at 50°, and the product isolated and treated with

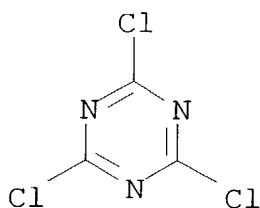
0.33 mol ClCn and 0.307 mol Et3N at 0° in CH2Cl2. Heating 20 g of this cyanate resin 5 h at 160° in the presence of 0.2% wt. Zn octoate gave a bright yellow, very hard polytriazine.

IT 108-77-0D, reaction products with aminophenols, cyanamide and cyanate derivs. 506-77-4D, reaction products with aminophenol-cyanurate chloride adducts

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(crosslinking and trimerization of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

IC C08G073-06

CC 36-3 (Plastics Manufacture and Processing)

ST polytriazine manuf; **cyanuric chloride**
aminophenol adduct; cyanate contg triazine resin; trimerization
crosslinking cyanated polytriazine

IT 83-55-6D, reaction products with cyanurate chloride, cyanamide and cyanate derivs. 108-77-0D, reaction products with aminophenols, cyanamide and cyanate derivs. 150-75-4D, reaction products with cyanurate chloride, cyanamide and cyanate derivs. 506-77-4D, reaction products with aminophenol-cyanurate chloride adducts 837-11-6D, reaction products with cyanurate chloride, cyanamide and cyanate derivs. 2835-95-2D, reaction products with cyanurate chloride, cyanamide and cyanate derivs.

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(crosslinking and trimerization of)

L24 ANSWER 9 OF 19 HCA COPYRIGHT 2004 ACS on STN

85:95148 s-Triazine prepolymers. Sundermann, Rudolf; Puetter, Rolf; Grigat, Ernst (Bayer A.-G., Fed. Rep. Ger.). Ger. Offen. DE 2457081 19760610, 38 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1974-2457081 19741203.

AB Prepolymers useful in the prepn. of glass fiber laminates with reduced heat evolution and shrinkage are prepd. by condensing

polyols with >0.33 mole **cyanuric chloride** (I) per OH group, condensing this product with arom. polyols (≥ 1 OH group per unreacted Cl), and converting free OH to cyanate groups with cyanogen halides and bases. Thus, adding 40.4 g Et₃N over 2 hr to 12.4 g HOCH₂CH₂OH and 73.8 g I in 300 ml Me₂CO stirred at 30-40°, stirring 3 hr at 50°, stirring 36 g this product and 91.2 g bisphenol A in 400 ml Me₂CHOH at 30-40° while adding 40.4 g Et₃N dropwise, refluxing 6 hr, and stirring 112 g this product with 27 g ClCN [506-77-4] in 200 ml CH₂Cl₂ at 0° while adding 40.4 g Et₃N in 300 ml CH₂Cl₂ dropwise gives 116 g NCO-terminated prepolymer [60020-90-8].

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(esterification by, of **cyanuric chloride**
-polyol polymers)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C08G065-00

CC 36-3 (Plastics Manufacture and Processing)

ST triazine polyol polymer; **cyanuric chloride**
polyol polymer; bisphenol A triazine polymer; ethylene glycol
triazine polymer; **cyanogen chloride** reaction
polymer; cyanate terminated triazine polymer

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(esterification by, of **cyanuric chloride**
-polyol polymers)

L24 ANSWER 10 OF 19 HCA COPYRIGHT 2004 ACS on STN

84:121781 Generation and certain reactions of
bis(trifluoromethyl)azanion. Gontar, A. F.; Bykhovskaya, E. G.;
Knunyants, I. L. (Inst. Elementoorg. Soedin., Moscow, USSR).
Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya (10), 2279-82
(Russian) 1975. CODEN: IASKA6. ISSN: 0002-3353.

GI For diagram(s), see printed CA Issue.

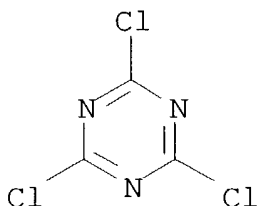
AB Heating CsF with CF₃N:CF₂ in MeCN or diglyme 30 min gave (CF₃)₂N-
Cs⁺ (I), useful for introduction of (CF₃)₂N group into org. compds.
I treated with BrCH₂CO₂Et 3 hr gave 45% (CF₃)₂NCH₂CO₂Et; BrCH₂CH:CH₂
gave 43.5% (CF₃)₂NCH₂CH:CH₂. II was obtained in 62% yield by
treatment of **cyanuric chloride** with I.
Perfluorocyclobutene and I gave 82% III. Epoxide IV and I gave
48.5% (CF₃)₂NCF(CF₃)COF which was hydrolyzed to give
(CF₃)₂NCF(CF₃)CO₂H or treated with alcs. to give (CF₃)₂NCF(CF₃)CO₂R
(R = Me, Et).

IT 108-77-0 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with bis(trifluoromethyl)azanion)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C≡N

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))
Section cross-reference(s): 23, 24

IT 105-36-2 106-95-6 **108-77-0** 382-21-8 428-59-1

506-77-4 697-11-0

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with bis(trifluoromethyl)azanion)

L24 ANSWER 11 OF 19 HCA COPYRIGHT 2004 ACS on STN

78:58992 Prevention of setting of coagulation of **cyanuric chloride**. Nakayama, Tsutomu; Saito, Shijio; Taguchi, Fujiro; Yamakawa, Osamu (Nitto Chemical Industry Co., Ltd.). Jpn. Kokai Tokkyo Koho JP 47020181 19720927 Showa, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1971-12195 19710309.

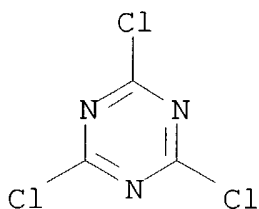
AB Acceleration of **cyanuric chloride** (I) [**108-77-0**] particles in a high-speed stream of inert gas caused the particles to collide and thus impurities, such as H₂O, Cl, HCl, or CNCl, adsorbed on I particles were removed to give I which did not coagulate for >3 months at 40.deg..

IT **108-77-0P**

RL: PREP (Preparation)
(drying of, for agglomeration prevention)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IT 506-77-4

RL: PROC (Process)

(sepn. of, from **cyanuric chloride** for
agglomeration prevention)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

NCL 16E473

CC 35-2 (Synthetic High Polymers)

ST **cyanuric chloride** particle purifn; coagulation
cyanuric chloride

IT Agglomeration

(of **cyanuric chloride**, drying for prevention
of)

IT Drying

(of **cyanuric chloride**, for agglomeration
prevention)

IT 108-77-0P

RL: PREP (Preparation)

(drying of, for agglomeration prevention)

IT 506-77-4 7647-01-0, uses and miscellaneous 7782-50-5,
uses and miscellaneous

RL: PROC (Process)

(sepn. of, from **cyanuric chloride** for
agglomeration prevention)

L24 ANSWER 12 OF 19 HCA COPYRIGHT 2004 ACS on STN

77:140156 **Cyanuric chloride**. Wolf, Friedrich;Renger, Peter (VEB Chemiekombinat Bitterfeld). Ger. Offen. DE
2159040 19720713, 9 pp. (German). CODEN: GWXXBX. APPLICATION: DE
1971-2159040 19711129.

GI For diagram(s), see printed CA Issue.

AB **Cyanuric chloride** (I) was manufd. by
trimerization of ClCN(g) at 310° over zeolitic mol. sieves.
Thus, ClCN was passed at 0.6 vol./vol. catalyst-hr at 310°
over cryst. zeolitic 0.98 Na₂O.Al₂O₃.2.5 SiO₂ catalyst (treated 40

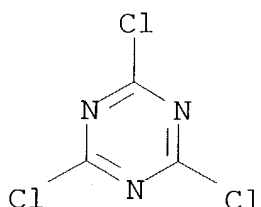
hr with N HCl, dried, and heated 5 hr at 560°) to give 80-90% I.

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC C07D

CC 28-21 (Heterocyclic Compounds (More Than One Hetero Atom))

ST **cyanuric chloride** catalyst; mol sieve

cyanuric chloride; zeolite catalyst

cyanuric chloride; aluminum silicate

cyanuric chloride

IT Zeolites

RL: CAT (Catalyst use); USES (Uses)

(catalysts, for trimerization of **cyanogen chloride**)

IT Trimerization catalysts

(zeolites, for trimerization of **cyanogen chloride**)

IT 12253-39-3

RL: CAT (Catalyst use); USES (Uses)

(catalysts, for **cyanogen chloride** trimerization)

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

L24 ANSWER 13 OF 19 HCA COPYRIGHT 2004 ACS on STN

74:140911 Telomers. Sawada, Seiji; Kozai, Yotaro; Koda, Hajime; Kobayashi, Kihachiro (Japan Soda Co., Ltd.). Jpn. Tokkyo Koho JP 46003163 B4 19710126 Showa, 4 pp. (Japanese). CODEN: JAXXAD. APPLICATION: JP 19650426.

AB Cl-contg. low-mol.-wt. telomers (av. d.p. <10) were prepd. in high yields without increasing the amt. of the by-products (paracyanogen and **cyanuric chloride**) by adding benzoquinone (or anthraquinone) or catechol to a mixt. of Cl-contg. telogens (CNCl, CH₂Cl₂, CHCl₃), ethylene, and a polymn. initiator. Thus, CNCl was mixed at 0° with tert-Bu₂O₂ and benzoquinone and the

mixt. treated with ethylene at 40 atm (at 20°) and heated at 150° 1.5 hr to give telomers (1.2, 62.5, 27.8, 8.0, and 0.5 wt. % content for d.p. = 1, 2, 3, 4, and 5) contg. 2.8 wt. % paracyanogen and 4.3 wt. % cyanuric **cyanuric chloride**.

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(telomerization of)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C07B; C08F; B01J

CC 23 (Aliphatic Compounds)

ST telomer low mol wt; ethylene alkyl halide telomer; **cyanogen chloride** ethylene telomer; methylene chloride ethylene telomer; chloroform ethylene telomer

IT 67-66-3, reactions 75-09-2 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(telomerization of)

L24 ANSWER 14 OF 19 HCA COPYRIGHT 2004 ACS on STN

72:110783 Continuous reclamation of usable gaseous components.
Riethmann, Jean; Scheck, Leo (Agripat S. A.). Ger. Offen. DE 1934856 19700219, 15 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1969-1934856 19690709.

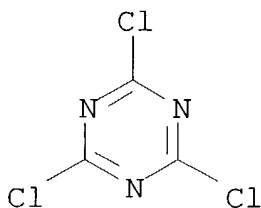
AB An absorber and evaporator were brought to equil. with 1677 wt. parts pent achloroethane (I) and 0.3 wt. parts iodine at 70 and 160-5°, resp. Gas consisting of HCl 48.8, Cl 47.5, and ClCN 3.7 wt. % was fed into the absorber at 11.96 wt. %/hr. Solys. of 0.1 HCl, 2.3 Cl, and 8.6% ClCN at 70° in I allowed sepn. of the HCl. Above the evaporator was a glass-bead 160-5° distn. column. The 30° condenser above this fed liq. I into a 0-5° condenser from which the liq. returned to the absorber. The HCl was released and bubbled into H2O. The Cl and ClCN gases with I vapors were uv-irradiated. The gases and hexachloroethane were sepd., the former going into a reactor .

IT 108-77-0P

RL: PREP (Preparation)
(recovery of waste gases in manuf. of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC C07D
 CC 23 (Aliphatic Compounds)
 ST **cyanogen chlorides** manuf; **chlorides**
cyanogen manuf; chlorination pentachloroethanes;
 chloroethanes chlorination
 IT **108-77-0P**
 RL: PREP (Preparation)
 (recovery of waste gases in manuf. of)

L24 ANSWER 15 OF 19 HCA COPYRIGHT 2004 ACS on STN

72:100082 **Cyanogen chloride** and its polymers.

Matasa, Claudiu (Romania "Petrochimic" Co.). Rom. RO 52020
 19691203, 2 pp. (Romanian). CODEN: RUXXA3. APPLICATION: RO
 19680221.

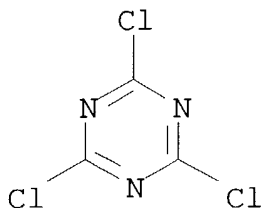
AB Non-toxic raw materials are used for prepg. ClCN by catalytic
 dehydration of HCN, carbamoyl chloride or mixts. thereof, with
 excess HCl at 300-700°/1-20 atm in 1.1-15 HCl-HCN molar
 ratios and 0.1-10 HCl moles/mole NH₂COCl, and trimerizing the
 resulting ClCN using Group I-IV metal chloride catalysts, followed
 by sudden cooling to avoid the hydrolysis. Thus, a mixt. of 1
 mole/hr NH₃-free HCN (g) and 3 moles/hr HCl (g) was bubbled through
 a molten salt at 400° contg. AlCl₃ 60, FeCl 5, and NaCl 30%,
 then the reacted gas mixt. was cooled by liq. n-butane injection to
 give 0.3 mole/hr **cyanuric chloride**.

IT **108-77-0P 506-77-4P**

RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

Cl-C \equiv N

IC C07C

CC 23 (Aliphatic Compounds)

ST **cyanogen chloride** prepn trimerization;
cyanuric chloride

IT 108-77-0P 506-77-4P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

L24 ANSWER 16 OF 19 HCA COPYRIGHT 2004 ACS on STN

71:51785 Continuous production of liquid **cyanuric chloride**. Riethmann, Jean; Moerikofer, Andreas (Geigy, J. R., A.-G.). Ger. Offen. DE 1809194 19690612, 18 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1968-1809194 19681115.

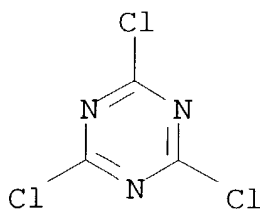
AB Gas mixt. from the reactor (U.S. 3,312,697 (CA 67: 6121v) contg. **cyanuric chloride** (I), CNCl, and Cl (and HCl if the process of Fr. 1,311,400 was used) was scrubbed with POCl₃ in a fractionating column, with the upper part kept at 140-5° and the lower part at 200-60°. POCl₃ evapd. in the lower part and liq. I was collected in a catchpot at 198-200°, where part of it evapd. and returned to the column, together with traces of POCl₃. I contg. <50 ppm. POCl₃ was siphoned off continuously. Gases not condensed at 15-25° were fed back into the reactor.

IT 108-77-0P

RL: PREP (Preparation)
(recovery of, from gases by scrubbing with phosphoryl chloride)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC C07D

CC 49 (Industrial Inorganic Chemicals)

ST **cyanuric chloride** prodn; **cyanogen chloride** prodn; **chlorides cyanogen** prodn

IT 108-77-0P

RL: PREP (Preparation)
(recovery of, from gases by scrubbing with phosphoryl chloride)

L24 ANSWER 17 OF 19 HCA COPYRIGHT 2004 ACS on STN

69:26735 Vilsmeier adducts of dimethylformamide. Scott, M. D.; Spedding, H. (Esso Res. Centre, Esso Petrol. Co., Ltd., Abingdon, UK). Journal of the Chemical Society [Section] C: Organic (13), 1603-9 (English) 1968. CODEN: JSOOAX. ISSN: 0022-4952.

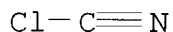
AB The reactions of HCONMe₂(DMF) with ClCN and with SOCl₂ were studied, and several of the products identified by spectroscopic methods. As in the case of a previously reported reaction between DMF and **cyanuric chloride**, Vilsmeier adducts are formed. For the ClCN reaction a mechanism is put forward that accounts for the products more satisfactorily than would the **cyanuric chloride** mechanism. Among the products, those identified are 3-dimethylamino-2-azaprop-2-enylidene-dimethylammonium chloride, 3-(N,N-dimethylcarbamoyl)-1,1-dimethylformamidine, 1,1-dimethylformamidine-HCl, 1,1-dimethylurea, 1,1-dimethylbiuret, Me₂NH.HCl, and cyanuric acid. The ClCN adduct reacts with Ph₂NH to form HCONPh₂. The adduct formed between DMF and SOCl₂ is fairly stable, but it decomp. slowly in air in a complex manner. Several of the products were identified. The adduct reacts with aniline to form 1,3-diphenylformamidine in addn. to the expected 1,1-dimethyl-3-phenylformamidine.

IT 506-77-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with N,N-dimethylformamide)

RN 506-77-4 HCA

CN Cyanogen chloride ((CN)Cl) (9CI) (CA INDEX NAME)

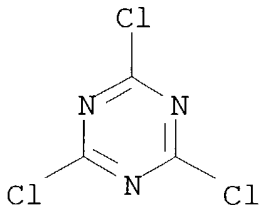


IT 108-77-0

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with diphenylamine in presence of
N,N-dimethylformamide)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



CC 23 (Aliphatic Compounds)

ST vilsmeier adducts dimethylformamide; adducts vilsmeier

dimethylformamide; dimethylformamide vilsmeier adducts; amides vilsmeier adducts; formamides vilsmeier adducts; **cyanogen chloride** dimethylformamide; thionyl chloride dimethylformamide

IT 506-77-4 7719-09-7

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with N,N-dimethylformamide)

IT 122-39-4

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with **cyanogen chloride** in presence of N,N-dimethylformamide)

IT 108-77-0

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(reaction of, with diphenylamine in presence of N,N-dimethylformamide)

IT 68-12-2, reactions

RL: RCT (Reactant); **RACT (Reactant or reagent)**
(with **cyanogen chloride**)

L24 ANSWER 18 OF 19 HCA COPYRIGHT 2004 ACS on STN

68:105256 Process for producing **cyanuric chloride**.

Kodama, Yutaka; Sasakura, Toshisuke; Takata, Saburo; Shinjo, Masaru; Nakabayashi, Masao; Tamura, Hiroaki (Toyama Chemical Industry Co., Ltd.). Brit. GB 1086706 19671011, 3 pp. (English). CODEN: BRXXAA. APPLICATION: GB 19641222.

AB **Cyanuric chloride** is prep'd. by polymg.

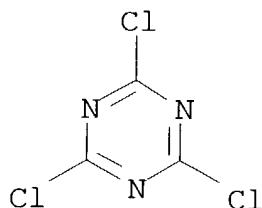
cyanogen chloride, or treating HCN and Cl, in the presence of a catalyst. A eutectic mixt. contg. AlCl₃ and (or) FeCl₃ with 1 or more halides of alkali metals, alk. earth metals, Zn, Cu, or Pb has good catalytic activity for this reaction. In an example, a eutectic mixt. of AlCl₃ and NaCl in the ratio 70:30 by wt. was heated to melting at 380-400°. **Cyanogen chloride** was bubbled through this catalyst at 18 g./hr. for 40 hrs.; 662.4 g. of **cyanuric chloride** (92% yield) of 99% purity was obtained.

IT 108-77-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



IC C01C
CC 28 (Heterocyclic Compounds (More Than One Hetero Atom))
ST **CYANURIC CHLORIDES**
IT **108-77-0P**
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of)

L24 ANSWER 19 OF 19 HCA COPYRIGHT 2004 ACS on STN

67:55771 **Cyanuric chloride** from **cyanogen**

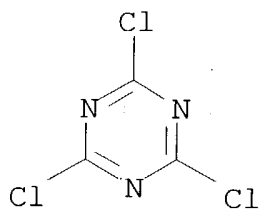
chloride. Kodama, Yutaka; Sasakura, Toshisuke; Takata, Saburo; Shinjo, Masaru; Nakabayashi, Masao; Tamura, Hiroaki (Toyama Chemical Industry Co., Ltd.). U.S. US 3326911 19670620, 2 pp. (English). CODEN: USXXAM. APPLICATION: US 19641223.

AB A catalytic method for prepg. **cyanuric chloride** consists of bubbling ClCN or a mixt. of HCN and Cl through a molten eutectic mixt. of AlCl₃ and an alkali metal halide or alk. earth metal halid. Thus, ClCN was bubbled through a molten mixt. consisting of AlCl₃ 70 and NaCl 30% by wt. maintained at 380-400°. **Cyanuric chloride** of 99.1% purity was obtained in 94% yield.

IT **108-77-0P**
RL: IMF (Industrial manufacture); PREP (Preparation)
(manuf. of, from **cyanogen chloride**)

RN 108-77-0 HCA

CN 1,3,5-Triazine, 2,4,6-trichloro- (9CI) (CA INDEX NAME)



NCL 260248000

CC 49 (Industrial Inorganic Chemicals)

ST **CYANURIC CHLORIDE PREPN; CHLORIDE**
CYANURIC PREPN; CYANOGEN CHLORIDE PREPN;
CYANURIC CHLORIDE

IT **108-77-0P**

RL: IMF (Industrial manufacture); PREP (Preparation)
(manuf. of, from **cyanogen chloride**)